AN INVESTIGATION INTO THE POOR IMAGE OF THE CONSTRUCTION INDUSTRY AND ITS EFFECT ON THE SUSTAINABILITY OF THE INDUSTRY

By

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A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Science in Construction Management in the College of Agriculture, Engineering and Science, University of KwaZulu-Natal, Durban, South Africa.

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COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE

DECLARATION - PLAGIARISM

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2. This thesis has not been submitted for any degree or examination at any other university.

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ABSTRACT

The construction industry is an important role player in any country. Past research has shown that the industry suffers from a poor image which, *inter alia*, resulted in a lack of new entrants. A quarterly survey conducted by the Construction Industry Development board (CIDB) showed that over 50% of survey respondents recorded a severe shortage in skilled labour.

The objective of this study was to determine how young people viewed the construction industry, how employers and employees within the industry viewed construction, whether companies were involved in promoting the industry, and if the industry was attractive as a career choice to high school students.

The literature reviewed stated that the construction industry was globally suffering from a poor image and critical shortage of skills. The literature provided the researcher with a number of factors which contributed to the industry's poor image. These factors were empirically tested against the opinions of high school students and employers and employees in construction via questionnaires. Interviews were conducted with industry professionals who had over 20 years of industry experience. The interviews allowed insight into the image and what has made it poor. It also indicated that there was little being done to promote careers in the industry.

The industry did have a poor image from the perceptions of high school students, employers and employees. Very few students indicated a willingness to work in construction. The lack of new entrants, shortage of skilled labour and lack of promotion were not conducive to a sustainable industry.

The dissertation ends with recommendations for addressing the issue of the image from the perspective of high school students and recommendations for further research.

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CHAPTER 1 – INTRODUCTION

1.1 Introduction

The introductory chapter will provide the reader with an overview of this study. This chapter gives an introduction to previous research that was done in a similar field. It identifies the research problem and hypotheses which stemmed from the problem, and it lists a number of objectives that will be researched according to the methodology outlined herein. The chapter concludes with a summary of what each of the following chapters will contain.

1.2 Background

Being one of the biggest industries worldwide, the construction industry plays a significant role towards the social and economic development of any country. Socially, it provide communities with places for housing, education, culture, medication, business, leisure, entertainment as well as urban infrastructure such as water and power supply, sewerage, drainage, roads, ports, railways and telecommunications (Roodman and Lenssen, 1995). Economically, according to Wibowo (2009) and Mthalane, Othman and Pearl (2007), the construction industry contributes to a country's economy by providing most of the country's fixed capital assets and infrastructure that support other industries, creating job opportunities, and increasing national Gross Domestic Product (GDP).

The construction industry contributes significantly to the South African economy (Cumberlege, 2008). In 2012, the construction industry contributed about R59,422 million to the (GDP) at 2005 price levels, an amount of R112,631 million at the current price level of 2013. The construction industry contributes 3.5% of the South African GDP (Statistics SA, 2013). According to the statistical release on the GDP of the 4th Quarter of 2012, the construction industry grew by 3.1% since 2011, whereas total Real GDP grew by 2.5% on a year-on-year basis (*Ibid)*. In September 2012, the construction industry employed an estimated 433,000 employees, about 5.1% of the South African workforce (Statistics SA, 2012). The South African government has declared the industry as a strategic national asset and it is convinced that the construction industry can be used to achieve economic growth and improve the quality of life of the population (Didiza, 2008). It is therefore very important that the industry maintains steady growth and provides attractive environment to new entrants. It is paramount that the industry enjoys a sustainable future. Wibowo (2009) highlighted the importance of the construction industry as it attracted fixed capital investment which represented the government's investment into the future of the national economy. According to the

International Labour Organisation (ILO) (2001), there is a close relationship between construction activities and economic growth. In order for developing countries to experience economic growth, governments must invest into fixed capital formation. Despite the importance of the industry, the country's economic growth is limited by the negative perceptions that the public have of the industry (Rameezdeen, 2007; Pearce, 2003).

The image of the construction industry has come under scrutiny in recent years. Globally, it has been noted that the construction industry suffered from a poor image. Many authors (Rameezdeen, 2007; Chan and Connolly, 2012; Skitmore, 1991; Tucker, et al., 1999; Pearce, 2003; Sizemore, 2006; Makhene and Twala, 2009; ILO, 2001; DG Enterprise, 2000; Clarke and Boyd, 2011) from different countries have identified the negative image of the sector as a problem facing the industry.

The construction industry suffers from several negative factors that impact its image such as, the common practice in South Africa of fraud and corruption (Pearl, et al., 2005), the alarming amount of site accidents (Pearce, 2003), the political interference at the tender stage of public sector projects (CIDB, 2011), the existence of tender rings or cartels by key construction companies (Visser, 2013), and the presence of "Cowboy Builders" who have no qualifications and little regard to training (DG Enterprise, 2000:8).

The poor image of the industry has limited the growth of the industry as there are fewer new entrants in the industry, resulting in critical skills shortages and an increase in the national unemployment level (ILO, 2001). Young adults tended to work in offices rather than on sites. They viewed any career that involved manual labour as a low status career due to the wages being low in comparison with other industries and the lack of clear career paths (Tucker, et al. 1999). It has been noted by several authors (Makhene and Twala, 2009; ILO 2001; DG Enterprise, 2000; Pearce, 2003) that the construction workforce is an ageing one. The proportion of the ageing workforce is growing due to the reduction in the amount of new entrants into the industry (Haupt, et al., 2010). There are not enough new entrants to offset the amount of people who are retiring from the workforce (DG Enterprise, 2000). The unattractiveness of the industry has an effect on the amount of investments made in the property and construction sectors. The construction industry is generally the industry which suffers from a recession first and recovers from it last (Mukucha, Mphethi and Maluleke, 2010).

According to the Business Conditions Survey conducted by CIDB (2012a:5) in the 3rd quarter of 2012, which researches the economic conditions experienced by construction companies, 46% of building contractors and 45% of civil contractors responded that they experienced "serious shortages of skilled labour". As the construction industry was still recovering from the

2008/09 recession, business confidence was generally on the increase and the majority of the survey respondents were optimistic about the future (CIDB, 2012b). As the demand for work increases, the demand for skilled labour increases relatively. The same survey conducted in the 4th quarter of 2012 revealed that 54% of overall respondents recorded serious skills shortage. The increase of 9% during the last quarter was indicative that demand for critical skills was on the increase (CIDB, 2012b). However, due to the construction industry's poor image and the lack of new entrants, the supply of skilled labour was on a decline (Skitmore, 1991).

It is evident that there is great concern regarding the future levels of skills shortages. It is therefore vital for the sustainability of the construction industry that the image of the industry should improve in order to attract new entrants (DG Enterprise, 2000).

1.3 Problem Statement:

The research problem may be stated as:

The construction industry suffers from a poor image, resulting in a critical skills shortage due to the lack of new entrants into the industry, consequently hindering the growth and sustainability of the industry.

1.4 Hypotheses:

The following hypotheses will be tested namely:

1. Improving the poor image of the construction industry will improve its sustainability by attracting more new entrants; and
2. The critical skills shortage is due to the poor image and the lack of promotion and knowledge of careers in construction.

1.5 Objectives:

The study seeks to achieve the following objectives namely:

1. To determine if promotion affects the attractiveness of careers in construction; and
2. To determine if there is a lack of promotion and knowledge of careers in construction resulting in a critical skills shortage.

1.6 Research Methodology:

In order to achieve the objectives of the study, the following research approaches were adopted, namely:

- A comprehensive review was done of literature and previous studies on the area of research to contextualise the study, identify gaps in previous research and development of the research approach and instruments to be used to gather the necessary data;
- Structured questionnaires were distributed to a sample of high school students and construction companies in order to establish their views on the construction industry;
- Structured interviews were conducted with a sample of owners of construction companies, who have been in the industry for over 20 years, to determine if the industry professionals felt that the construction industry had a poor image, what the impact of it was, if they felt that the critical skills shortage was linked to the poor image and if they were actively promoting the industry;
- The data was analysed statistically using SPSS; and
- Conclusions were drawn from the findings of the study and recommendations for possible implementation and further research will be formulated.

1.7 Assumptions:

The study is subject to the following assumptions, namely that:

- The construction industry has a poor or negative image;
- There is a critical shortage of skills; and
- All participants in the study will respond willingly, comprehensively and accurately.

1.8 Limitations:

The study limitations were:

- The study was confined to the province of KwaZulu-Natal given the budgetary constraints.
- The study was conducted between February and September 2013.

- Only construction enterprises registered with the Master Builders Association, construction workers at these enterprises and high school students in the Durban area were included in the study.

1.9 Ethical considerations:

In order to ensure that internationally accepted ethical standards are maintained, no names of individuals or organisations were recorded on the research instruments. During the research process, anonymity could not be guaranteed but the participants were ensured that their responses would be kept confidential. Only aggregated results would be reported. The aims of the research were explained to all participants. No compensation was paid to any respondents for participating in the study. Quality was assured through the following aspects of the research:

- Interviewer competence where interviews and surveys were conducted;
- Correctness of responses to questions, and
- Efficiency of data capturing done by encoders of data.

1.10 Significance of study:

There can be no doubt as to the importance of a strong and healthy construction industry in which clients can invest with confidence. The construction industry has an impact on almost all other industries as none of them could function without the physical structures and infrastructure provided by the construction industry. The construction industry can potentially be a strong tool to counter the high levels of unemployment currently experienced in South Africa. The industry has been suffering from a poor image in recent years due to poor quality products, poor working conditions and a preconceived idea that dated technology is used in construction. The poor image has resulted in young people being discouraged from pursuing a career in construction. Construction companies have been experiencing a severe shortage of skilled labour and research showed that the workforce is an aging one with few young entrants. It is important to research and identify the factors that cause this poor image and the promotion that has been and could be done to attract new blood into the industry. It is expected that if the issues regarding the image were addressed and young people attracted to the industry, the industry would grow and be sustainable. If these issues were not addressed, the SA industry would shrink and potentially reduce its contribution to socio-economic growth.

1.11 Structure of the study:

Chapter 1: Introduction

This chapter provided the context of and background to the research study, the statement of the problem, the study objectives and proposed research methodology to achieve these objectives. The study limitations, assumptions and structure have been outlined.

Chapter 2: literature review

The second chapter consisted of an extensive literature review. Literature on the image of the construction industry from previous research will be examined. Literature on the critical shortage of skills will also be provided. Factors that were contributing to the image of the construction industry will be identified and discussed. The chapter will also contain a review on recommendations that have been made to better the image of the industry.

Chapter 3: Research methodology

Chapter three provided the theory on the research methodologies to be used during the course of this study. The methodologies used to test the hypotheses identified in chapter one. It provided definitions and brief descriptions on what research methodology entail and the two branches it has, namely quantitative and qualitative research methodologies. This chapter identified and described the population and the sample drawn from it. It also stated how the data was analysed and presented in order to assess the data collected. The chapter included information on reliability and validity of the data collected.

Chapter 4: Data collection and analysis

The fourth chapter contained all the data collected and the analysis thereof. The analysis of the data was done according to the methods stated in chapter three.

Chapter 5: Conclusion and recommendations

In the final chapter, the study as summarised and concluded based on the findings of the study. Recommendations for implementation and further research were included.

1.12 Summary

This chapter introduced the reader to the concepts this study will follow. It identified a research problem, hypotheses, objectives and the research methodologies that will be used to obtain

these objectives. The following chapter contains a thorough literature review of previous research in a similar field.

CHAPTER 2 – LITERATURE REVIEW

2.1 Introduction

According to Welman, Kruger and Mitchell (2005), researchers classically identify a research problem by conducting a literature review. Researchers could determine what research had already been done on the topic, avoid duplicating past research findings and identify gaps justifying further research, through a comprehensive literature review. The following elements will be covered:

- The importance of the construction industry in a socio-economic context;
- The image of the industry and the promotion thereof;
- Certain factors which contributed to the industry's image;
- The critical skills shortage experienced by the industry;
- The realities of working as a construction labourer; and
- The sustainability of the construction industry.

2.2 The importance of the construction industry

The construction industry was important to the economy of any country. Whether it was first or third world (Rameezdeen, 2007; R Engineering Jobs, 2011; Dlamini, 2012; Wibowo, 2009; Didiza, 2008; Directorate-General [DG] Enterprise, 2000). According to Wibowo (2009), the construction industry contributed to the economy in the following ways, namely it:

1. provided basic infrastructure to countries, for example, roads, buildings, and mines;
2. provided physical structures for other industries;
3. created employment opportunities to become a major employer of labour; and
4. contributed to the national Gross Domestic Product (GDP).

The construction industry was an important sector in providing social and economic value to the population and country (Pearce, 2003).

2.2.1 The contribution of construction to the national economy

The construction industry played an integral part in the economies of countries. According to Lowe (2003, cited in Wibowo, 2009), the construction industry contributed between 7% and 10% of the GDP in developed countries and between 3% and 6% of the GDP in underdeveloped countries, as shown in Figure 1.

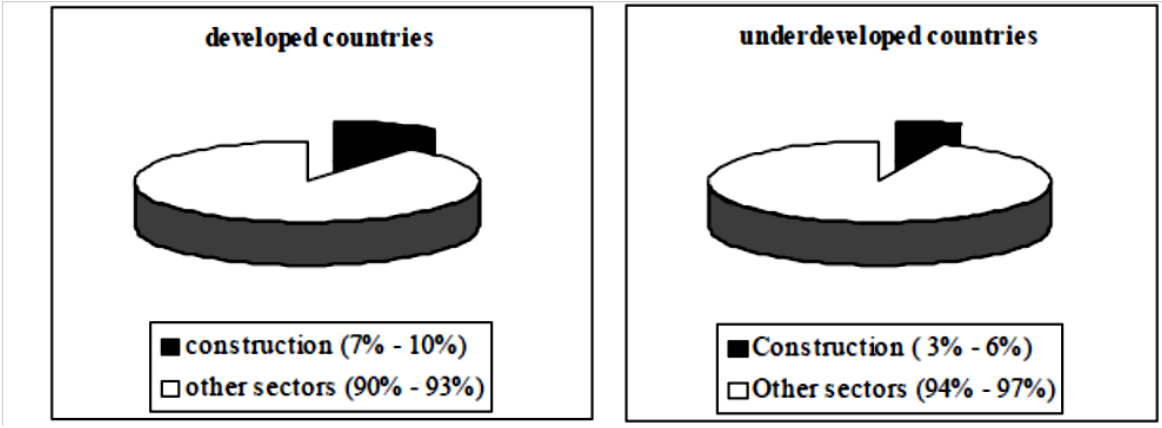

Figure 1 The Contribution of the Construction Industry into GDP (Lowe, 2003)

This trend is also apparent in South Africa, as the construction industry contributes 3.5% to the economy at current prices (Statistics SA, 2013a). However, there were other industries that were dependent on the construction industry. According to the National Construction Council (NCC) (2005:10), sectors such as education, tourism, mining, agriculture, health, energy, water and land were all reliant on a "reliable, strong and competitive local construction industry". For that reason, the contribution to the economy by the construction industry should not be limited to the percentage of GDP only. The manufacturing of plant and equipment used in construction was part of the 11% that was contributed to GDP by the manufacturing sector (Statistics SA, 2013a). The construction industry was responsible for constructing power plants and dams, accommodation, real estate and structures the finance sector and business services functioned in. Therefore, it was evident that the construction industry played a part in all sectors that contributed to the country's GDP. The construction industry was seen as the backbone of economy (Yeung and Chan, 2002; CIRC, 2001). In countries that experienced economic recession and high unemployment, the government often increased public expenditure in the construction (Ball and Wood, 1995). Aggregate demand for construction work was increased when governments implemented fiscal policy and increased spending in construction. As a result, demand for labour was increased due to more jobs being made available. The increased demand for labour resulted in increased supply of labour to offset the increased demand (Parkin, Powell and Matthews, 2005).

The construction industry was a strong contributor of employment to the national economy. The labour intensity of the construction industry allowed for an increase in employment opportunities when spending on construction output was increased (UKCG, 2009). According to the fourth Quarterly Labour Force Survey of 2012 (Statistics SA, 2012b:8), the construction industry currently employs about 1,061,000 people as shown in Figure 2, translating into 7.8% of total employment in South Africa.

Industry	Oct-Dec 2011	Jul-Sep 2012	Oct-Dec 2012	Qtr-to-qtr change	Year-on-year change	Qtr-to-qtr change	Year-on-year change
	Thousand					Per cent	
Total*	**13 497**	**13 645**	**13 577**	**-68**	**80**	**-0,5**	**0,6**
Agriculture	630	661	685	24	55	3,6	8,7
Mining#	327	349	357	8	30	2,3	9,2
Manufacturing	1 789	1 727	1 730	3	-59	0,2	-3,3
Utilities	81	105	98	-7	17	-6,7	21,0
Construction	1 057	1 046	1 061	15	4	1,4	0,4
Trade	3 060	2 962	2 921	-41	-139	-1,4	-4,5
Transport	788	834	816	-18	28	-2,2	3,6
Finance and other business services	1 739	1 811	1 804	-7	65	-0,4	3,7
Community and social services	2 902	3 025	3 028	3	126	0,1	4,3
Private households	1 118	1 124	1 076	-48	-42	-4,3	-3,8

Note: Total includes other industry.
#Mining is a very clustered industry, hence the industry might not have been adequately captured by the QLFS sample.
For more robust mining estimates, please use the Quarterly Employment Statistics (QES).
*Due to rounding, numbers do not necessarily add up to totals.

Figure 2 Total Employment by Industry (Stats SA 2012 Q4)

It should be noted that these figures represented both the combined formal and informal sectors of the construction industry. According to the Quarterly Employment Statistics of December 2012 (Statistics SA, 2013b), the formal construction industry currently employs 429,000 people. This indicates the vast size of the informal sector. However, the number of employees in the informal sector was generally difficult to determine in any industry (Yu, 2010). It was difficult to keep track of illegal workers, illegal work and all workers who were temporary employed (Muller, 2002). Kay (2011) stated that informal workers were more likely to be self-employed in the construction industry due to lower levels of education and skills required. Figure 3 indicates the difference in sizes of the formal and informal sectors in the construction industry of South Africa (CIDB, 2013a).

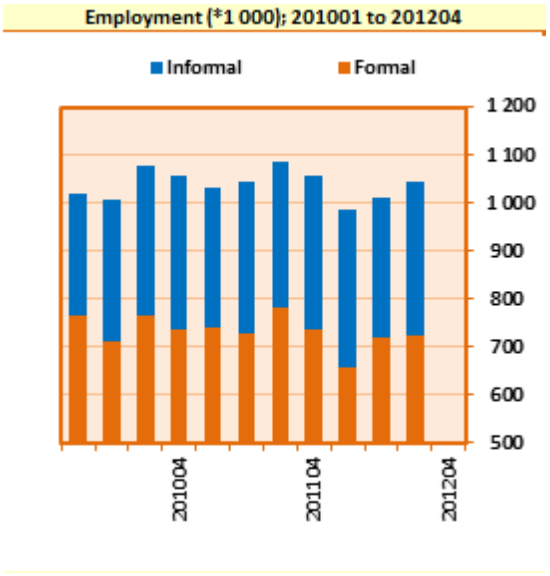

Figure 3 Formal and informal employment in construction 2010 to 2012 (CIDB 2013a)

2.2.2 The industry and economic growth

After reviewing the impact of the construction industry on the national economy and economic growth, it was evident that the construction industry was an important tool in achieving future economic growth (Dlamini, 2012; Lopes, 2009). What is economic growth? Parkin, Powell and Matthews (2005:796) defined economic growth as the *"expansion of the economy's production possibilities that results from capital accumulation and technological change."* Economic growth is measured by the increase of real Gross Domestic Product (GDP) (Parkin, Powell and Matthews, 2005). According to the classical economic growth theory, physical capital formation is the main driver of economic growth (Lopes, 2009). Economic growth increased the population's quality of life, which was one of the reasons the South African government had declared the construction industry a strategic national asset (Parkin, Powell and Matthews, 2005; Didiza, 2008). According to Lopes (2009), when a country experienced sustained economic growth, the growth rate of real GDP was generally at the same level as construction output growth rate. According to a White Paper entitled: "Creating an Enabling Environment for Reconstruction, Growth and Development in the Construction Industry", the government believed that small and micro-enterprises (SMEs) could contribute to achieving certain key economic objectives for the following reasons:

- it could be strong sources of income and employment;
- SMEs could be competitive in small projects in geographically dispersed locations due to their low overheads;

- the weak barriers to entry made it easier for historically disadvantaged persons to enter into the industry; and
- these SMEs could lay the foundation and become medium to large firms controlled by historically disadvantaged persons (Department of Public Works, 1999).

Governments influenced their economies by using macroeconomic policy tools such as fiscal and monetary policies. Fiscal policy related to changes in taxation and government spending (Parkin, Powell and Matthews, 2005). The construction industry was significantly affected by the implementation of fiscal policy. Fiscal policy was used primarily to achieve economic growth and reduce unemployment (Briscoe, 2009). By increasing government spending in the construction industry, demand for construction labour was increased and employment created to counter the rising demand (Cooke, 1996). The public sector allowed the government direct control of the industry. In developing countries, expenditure by the government on infrastructure was generally greater than in developed countries due to the higher demand for infrastructure in developing countries. The industry's dependence on the government as a client created the relationship between the industry and the country's economy. The government as a construction client could implement and control demand and spending in the industry (Hillebrandt, 2000).

Monetary policy is implemented by changing interest rates and the amount of money in the economy (Parkin, Powell and Matthews, 2005). The monetary policy is thus employed by banks rather than the government. Because of the high costs associated with the construction industry, construction clients and contractors were dependent on loans and their interest rates from financial institutions to fund projects. Changes in interest rates could cause a significant amount of interest as is the case with the long term loans apparent in construction projects. Clients needed credit to pay for their completed buildings. Construction companies needed credit in order to pay for labour, plant and materials, and to meet cash flow targets. In the case of large construction companies who operated on an international level, they were influenced by monetary policy as it affected exchange rates between countries (Briscoe, 2009).

2.3 The image of the construction industry

2.3.1 Image and the construction industry

Image was generally a subjective matter and would differ from one person to the next. The public's image could be described as a collection of individuals' perceptions. Image was formed by two components, namely functional and emotional. The functional component dealt with tangible sources of image formation such as the working conditions on construction sites and the appearance of construction workers. The emotional component dealt with psychological matters such as the public's attitude towards working in construction (Avenarious, 1993 cited in Rameezdeen, 2007:77).

It has been noted globally that the construction industry had been suffering from a poor image for a long time (Rameezdeen, 2007; Chan and Connolly, 2012; Pearce, 2003; ILO, 2001; Makhene and Twala, 2009; Clarke and Boyd, 2011). According to Rameezdeen (2007), the construction industry has become synonymous with low quality work, high cost and poor health and safety statistics. The poor image has resulted in the critical shortage of skills as there were fewer new entrants and people who viewed construction as a viable career option (Chan and Connolly, 2012; Clarke and Boyd, 2011). According to Chan and Connolly (2012), the poor image made it difficult to recruit, retain and develop a skilled workforce. Amaratunga, et al. (2006) cited the image of the construction industry as one of the main barriers that prohibited women from choosing a career in construction. The image problem could therefore be extrapolated to include both genders as it was a barrier that affected the career choice of the young adult population.

The general perception was that the construction industry still suffered from a negative image. The perception was created by information gathered and past experience with the industry (Ginige, Amaratunga and Haigh, 2007). According to Rameezdeen (2007), the image was influenced everyday by interactions between industry stakeholders and the public. The key could lie in addressing industry professionals and construction workers on their appearance and interaction with the public. The negative publicity local news companies generated by reporting on collapsed buildings that occurred in other countries also contributed to the negative image of the industry to the general public (South African Press Association [SAPA], 2013). Figure 4 illustrates Rameezdeen's (2007) cycle of a continuous poor image.

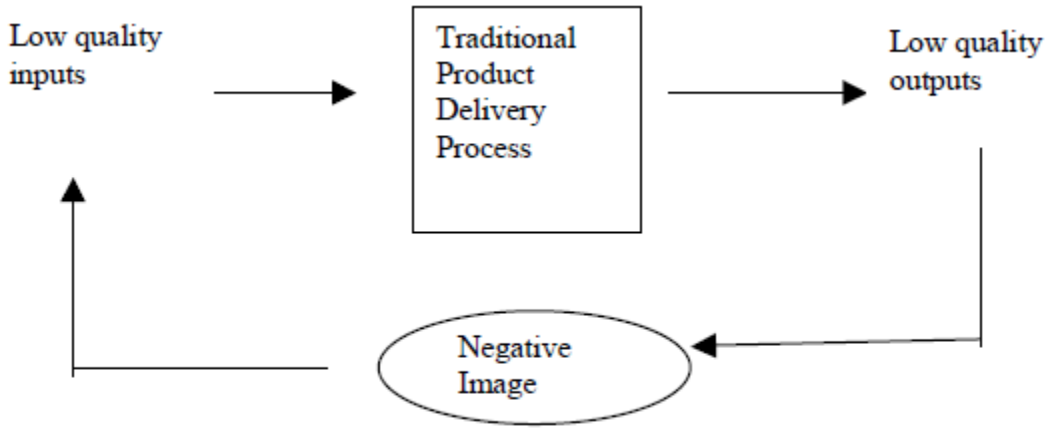

Figure 4 The vicious cycle of construction image (Rameezdeen, 2007)

Poor quality inputs, such as poor workmanship and materials, which passed through the traditional procurement and construction process, would result in poor quality outputs and require remedial work. Low quality of work provided by the construction sector would consequently contribute to the negative image. The negative image resulted in construction being an unattractive career choice. Young adults would view construction as unprofessional and it would result in fewer inputs in the form of skilled workers. The cycle needed to be addressed at the input level, or in other words, the workforce level. By dispelling misconceptions of the industry and by improving the education and the services of industry professionals, it might be possible to improve the image of the industry (Rameezdeen, 2007). The Construction Industry Review Committee (CIRC) (2001) agreed that workmanship had a direct influence on the quality of the outputs presented by the construction industry.

According to the ILO (2001), the construction industry's workforce and potential workforce also had negative perceptions of the industry. The poor image was due to the nature of the work being physically demanding, dirty and dangerous. DG Enterprise (2000) stated that people only applied for a job in construction as a last resort.

Rameezdeen's (2007) study showed that most of the respondents who had personal experience with the construction sector were the most negative about the image of the industry. This personal experience had a greater impact on the public's perception than the media had. Skitmore (1991) found the same phenomenon, namely that respondents' personal experiences, or a close relative's experience, with the construction sector had influenced their perception of the industry the greatest. The image of the industry could be improved not only by media promotion but also by improving the services provided by the industry professionals.

Rameezdeen (2007) suggested that mass media campaigns could be effective in attracting young people. The workforce and clients' perceptions should also be improved to retain and nurture a younger workforce. It would be possible to attract and retain new entrants, investors and developers by improving the public's image of the industry.

2.3.2 Construction clients' perception of the industry

Construction clients play a vital role in the health of the construction industry. If clients were not prepared to invest into the industry by having construction work done, the industry would shrink. For clients the quality and value of the products of construction were important (CIDB, 2011). The CIDB's Construction Industry Indicators (CII) report showed that only half of all tenders were evaluated according to quality and price. The price offered and personal preferences were preferred above quality during the tender evaluation stages (CIDB, 2013b).

Construction clients could be divided into two groups, namely, public and private sector clients

The public sector comprised in the main of five bodies, namely:

- Central government, for example, office buildings, infrastructure and engineering works;
- Provincial governments, for example, offices, schools, hospitals and workshops;
- Local municipalities or district councils, for example, housing, offices, libraries and basic services;
- Universities and technikons, for example, educational facilities, research complexes and sports facilities; and
- Public corporations or public companies under state control: Projects include offices, industrial buildings and commercial facilities (Hauptfleisch and Siglé, 2007).

The private sector comprised mainly of the following, namely

- Private persons, for example, residential developments and houses;
- Companies, for example, commercial offices, industrial warehouses or retail buildings;
- Religious communities, for example, churches, mosques and other places of worship;
- Insurance companies, for example, office buildings;
- Pension funds, for example, office buildings and property investments;
- Banks and other financial institutions, for example, office buildings specifically designed for banks or financial institutions; and

- Trusts, etc., for example, office buildings (Hauptfleisch and Siglé, 2007).

According to a study conducted by the CIDB (2011), the public sector accounted for 80% of civil works and around 20% of residential and non-residential projects. In general, clients were unhappy in both the private and public sectors. It was found that clients were least satisfied with the quality of work provided by contractors in the residential sector. In low- to middle-income residential construction, the quality of construction was ranked from poor to average. In upper-income residential projects, the quality was ranked from average to good. A worrying statistic is that the Department of Human Settlements stated that the government needed to spend 10% of its budget in 2009 and 2010 to rectify badly built Reconstruction and Development Programme (RDP) houses. This is cause for concern as significant amounts of money were required to redo work that had been done and paid for.

Poor quality of work was reported in private sector residential work as well. One of the causes was that the CIDB did not exercise regulatory control over the home building sector. The study showed that clients were neutral or dissatisfied with the quality of construction of 20% of projects and that 12% of the projects had defects rendering the structure inappropriate for its intended use. The clients should be encouraged to refuse poor quality work and demand better value (CIDB, 2011).

2.3.3 Promotion of the industry

According to DG Enterprise (2000), the industry needed to attract young people by promoting career opportunities which paid sufficiently and were viable. School students' career choices were generally influenced by their parents, teachers and career advisers. The industry should target its promotion to change the perception of parents, teachers and career advisers (DG Enterprise, 2000). The young students themselves needed to be attracted to the industry in order to consider a possible career in construction as viable (Clarke and Boyd, 2011). However, Chan and Connolly (2012) found that a sample of career advisers in the UK were generally optimistic about the construction industry and its contribution to the economy and infrastructure.

The Master Builders Association of South Africa has recently started to promote careers in construction by organising career days and launching the Youth in Construction website (www.youthinconstruction.co.za). The Gauteng Master Builders Association released documents online through the Youth in Construction (YIC) website which detailed the duties, working conditions and career advancement tips of bricklayers, plasterers, plumbers, architects

and 22 other career options. The YIC division held expos in every province during 2013 to which schools were invited (YIC, 2012).

2.4 The factors influencing the image of the construction industry

Several factors or perceptions influenced the image of construction, namely:

- *Careers in construction are less prestigious than other industries.*

Construction workers were viewed as blue collar workers which were synonymous with low status jobs (ILO, 2001). Young people viewed any career that involved manual labour as a low status career due to the wages being low in comparison with other industries and the lack of clear career paths (Tucker, et al., 1999). Young people viewed the status of a career as an important factor in deciding on a career path. According to ILO (2001), the construction industry in some countries such as, for example, Malaysia was reliant on illegal immigrants who were willing to work for very low wages and in poor working conditions. This problem was also apparent in developed countries (ILO, 2001). According to Schella (2010), parents and teachers saw a job in construction as a last resort when a job could not be found elsewhere.

- *Construction offers little career advancement opportunities.*

Career advancement opportunities in the construction industry were unclear. Makhene and Twala (2009) stated that there was a lack of well-defined career paths in construction. Young people felt that it was not possible to make a career out of construction and they generally did not know about the career opportunities that were available (Tucker, et al., 1999).

- *Jobs in construction do not pay as well as other industries.*

The potential salary and income were important to young people who had to choose a career. Makhene and Twala (2009) stated that it was generally felt that jobs in construction were paying less than other industries. The low wages were the main reason the construction industry was having trouble with retaining labour (ILO, 2001). Manual labourers in the manufacturing industry were paid more than construction labourers which resulted in young people preferring careers outside of construction (DG Enterprise, 2000).

- *Construction provides a harsh work environment.*

Construction work was generally done outside on sites. The work was seen as dirty, tough and unhealthy resulting in young people pursuing careers in other industries (Makhene and Twala, 2009; Tucker, et al., 1999). Workers were exposed to the natural elements which made it a difficult work environment. Construction workers were subjected to slippery conditions and discomforting conditions which potentially affected their health, safety and efficiency (Radevsky, et al., 2012). Construction workers were expected to work at different height levels which produced threats of workers and/or their tools falling from great heights. Construction workers who fell to their death were the most frequent cause of fatalities on site (Health and Safety Executive [HSE], n.d.).

- *The industry has poor health and safety records.*

Despite the recent efforts to improve the health and safety performance of the industry, there were still worrying amounts of site accidents and work related deaths (Pearce, 2003). The CIDB (2002) stated that the prominent amount of site accidents was due largely to lack of training and unregulated practices. The construction industry had the highest total amount of fatalities when compared with other industrial sectors. Further, the industry caused a significant amount of non-fatal injuries (Pearce, 2003). Young people were less likely to enter an industry which endangered their lives. In combatting this problem, the governing bodies have campaigned on the awareness of health and safety procedures (MBSA, 2013).

- *Professional ethics are not adhered to by professionals in construction.*

An opinion survey conducted in South Africa by Bowen, et al. (2007) revealed that construction professionals felt that contractors had a reputation for unethical conduct. It was felt that tendering practices were unfair. Contractors were responsible for deceit and misinformation. Vee and Skitmore (2003) found that 93% of survey respondents felt that ethics in the workplace were based and formed by the workers' personal ethics. It was worrying that all the respondents from this survey witnessed unethical conduct. In South Africa, councils of the various built environment professions are enacted by legislation to draw up a code of conduct that must be followed by their members. The following is a list of the relevant acts that exercise control in the construction industry:

  - Construction Industry Development Board Act (No. 38 of 2000);

- Council for the Built Environment Act (No. 43 of 2000);
- Architectural Profession Act (No. 44 of 2000);
- Landscape Architectural Profession Act (No. 45 of 2000);
- Engineering Profession Act (No. 46 of 2000);
- Property Valuers Profession Act (No. 47 of 2000);
- Project and Construction Management Profession Act (No. 48 of 2000); and
- Quantity Surveying Profession Act (No. 49 of 2000).

- *There is fraud and corruption in construction.*

It was generally known that fraud and collusion occurred within the construction industry (Pearl, et al., 2005; Vee and Skitmore, 2003). Construction companies formed cartels in order to monopolise a sector or geographical area. These cartels increased the tender prices submitted. The Competition Commission, a statutory body founded by the Competition Act (No. 89 of 1998) who controls and exercises fair competition and business practices, and the Hawks, the Directorate of Priority Crime Investigation who investigates serious charges of commercial crime and corruption, are currently investigating alleged collusion during the procurement stages of the 2010 FIFA World Cup stadia and related infrastructure. Several of South Africa's largest construction companies have admitted guilt while others were currently claiming innocence (Visser, 2013). According to CIDB (2011:ii), the barriers to quality in construction were "corruption, political interference and institutional barriers". These barriers were becoming more apparent in South Africa. The CIDB was adamant that fraudulent behaviour and corruption were one of the main factors contributing to poor construction quality (CIDB, 2011).

- *There are "cowboy" builders who provide poor services.*

The construction industry was typically dominated by large numbers of small businesses. These companies were generally owned and run by persons with no formal academic qualifications (DG Enterprise, 2000). These contractor companies were not registered with a governing body and were therefore not regulated or subject to Codes of Practice. These companies generally provided poor quality construction and negatively influenced the image of the construction industry (DG Enterprise, 2000; ILO, 2001). A study conducted by the CIDB (2011) identified this phenomenon in South Africa. The study showed that clients ranked construction quality from poor to average in the low- and middle income residential projects. The report concluded

that this was due to a lack of regulatory control as homebuilders were exempt from registering with the CIDB.

- *The construction industry is sensitive to economic conditions.*

According to Mukucha, Mphethi and Maluleke (2010), the construction cycle changed slower than the ordinary business cycle. The impact of the recent recession was experienced by the construction industry later than it affected other industries. However, in order to survive or reduce costs construction companies had retrenched some of their permanent labour force, and opted for employing cheaper unskilled immigrant labour (Mukucha, Mphethi and Maluleke, 2010). Snyman (2009) stated that the cycle in construction was more pronounced than other industries. It was important that industry professionals were alert in times of sudden economic shocks, for example, an unexpected rise in interest rates. The construction industry was slow to recover from the recent recession as the current business confidence level had deteriorated to 36 in the fourth quarter of 2012 (CIDB, 2012b). This figure was indicative of 36% of the respondents feeling that current business conditions were "satisfactory" (CIDB, 2012b:1). Due to the size of construction projects and the money involved, people were reluctant to invest in construction when economic conditions were uncertain (Mukucha, Mphethi and Maluleke, 2010). However, it has been noted that firms could increase their competitiveness in the industry by considering return on investment (ROI) in training their workforce. Firms should treat the training of their workforce as an investment and plan and implement their training as thoroughly as with any other form of investment (Glover et al., 1999).

- *There is little being done to promote the construction industry as a career choice.*

According to ILO (2001), the poor health and safety records of the industry strongly affected its image negatively. This effect could be countered through positive promotion of the sector. Steps had to be taken to encourage construction companies to promote the industry at school level (Chan and Connolly, 2012). Rameezdeen (2007) stated that the industry image could be improved by promoting Corporate Social Responsibility (CSR). The concept of CSR referred to professionals conducting business in an ethical manner with special reference to socio-economic sustainable practices. Companies were encouraged to consider the community and the quality of life of their workforce. The image of construction could also be improved by the promotion of "*quality of products, time cost and safety management, and education and training programmes*" (Rameezdeen, 2007:84). CSR could be used as a tool to counter negative

publicity (Vanhamme and Grobben, 2009). DG Enterprise (2000) stated that young people needed to be attracted to a career in construction through the promotion of the industry. Promotion was an important tool to expose the public to a product or service. It was possible to improve a firm's image and reputation through promotion. A positive image was needed to attract employees and investors to firms. If there was a perception that the firm, or industry, was operating unethically, it would not attract any employees, investors nor customers. Firms often used public relations to dispel any negative perceptions about them (Friedman, 2012). There was a general lack of promotion done by the various councils and associations in the built environment. People outside of the industry were not subjected to these governing bodies. The CIDB was mandated in terms of the Construction Industry Development Board Act with promoting an efficient and stable industry, and its contribution to meeting economic strategies (CIDB Act, No. 38 of 2000).

- *Construction is a male dominated industry.*

The construction industry has often been labelled as a male dominated society (Amaratunga, et al., 2006; Ginige, Amaratunga and Haigh, 2007). In the UK, only 9% of the construction workforce consisted out of women (Amaratunga, et al., 2006). The poor image, the work environment and family commitments were the main barriers that limited women from entering into the construction industry. It was perceived that construction work was synonymous with brute strength, harsh working environments and foul language which deterred women from entering the industry. People working in the construction industry were subject to frequent travelling to and from job sites. Women with family commitments were less prepared to travel to where the projects were especially if the distances were large (Amaratunga, et al., 2006). According to Ginige, Amaratunga and Haigh (2007) if there were a greater number of women in the construction industry, it would contribute to improving the image of the industry. In South Africa, companies were encouraged to recruit women in construction by the Broad Based Black Economic Empowerment Act (BBBEE). Construction companies had to comply with the BBBEE regulations in order to tender for public sector projects (BBBEE Act 2003 s.2(1)(d)). The South African Women in Construction (SAWiC) body was founded by the Development Bank of Southern Africa (DBSA) and had 100 members in 1999. SAWiC aimed to help empower women's contribution in the construction industry. In 2006, SAWiC enjoyed over 1,000 female members who were active in the South African construction industry. SAWiC worked in conjunction with the government and the Department of Public Works by providing members with training and business opportunities (CIDB, 2009).

2.5 The critical skills shortage

Arguably, the poor image of the industry had limited the growth of the industry as there were fewer new entrants in the industry. The lack of new entrants resulted in a critical skills shortage and an increase in the country's unemployment level (ILO, 2001). Young adults tended to want to work in offices rather than with their hands. They viewed any career that involved manual labour as a low status career due to the wages being low in comparison with other industries and the lack of clear career paths (Tucker, et al., 1999).

According to the Business Conditions Survey conducted by CIDB (2012b) in the 4th quarter of 2012, 54% of respondents recorded a critical skills shortage. The increase of 9% during the last quarter indicated that demand for critical skills were on the increase. However, due to the construction industry's poor image and the lack of new entrants, the supply of skilled labour was on a decline (Skitmore, 1991). As the construction industry was still recovering from the 2008/09 recession, business confidence was generally on the increase and the majority of the survey respondents were optimistic about the future as shown in Figure 5 (CIDB, 2013c).

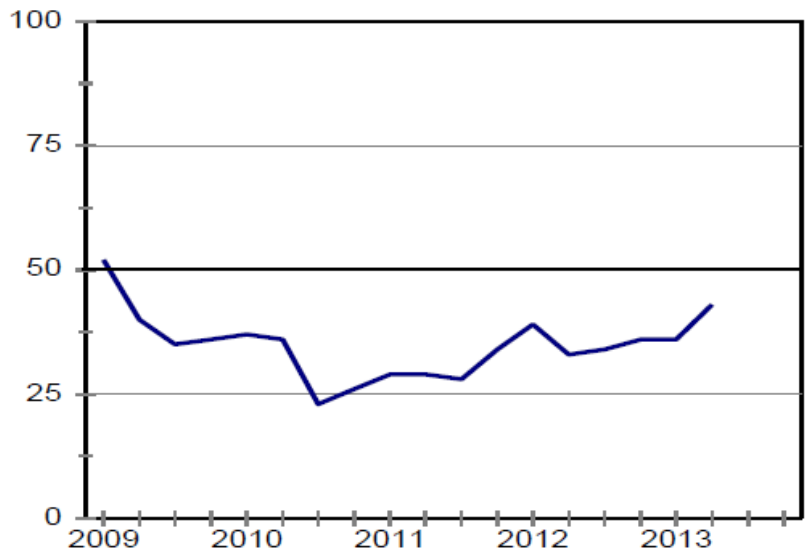

Figure 5 Business Confidence 2nd Quarter 2013 (CIDB, 2013c)

A report by McGraw-Hill Construction (2012) showed that 69% of respondents were expecting a skilled worker shortage by 2014. The report identified the following five factors that could impact the future workforce:

- As the leaders retired, there would be a severe loss of knowledge;
- As employees were retrenched, there would be a severe loss of experience and skill;
- Talented people were not interested in the industry due to the low wages;

- Young people did not view the industry as attractive; and
- The education system was inadequate for the next generation (McGraw-Hill Construction, 2012:24).

However, according to the UK Contractors Group (2009), employment in the construction industry was ideal for a younger workforce with limited skills and with few alternative employment opportunities. The report further stated that "construction is the best sector for stimulating employment" (UKCG, 2009:20). If there was an obvious demand for skilled labourers and if the construction industry was ideal for young people, why were they not interested in joining the workforce?

Makhene and Twala (2009:1) identified "an aging workforce, low pay, poor image and poor career paths for skilled labour" as the culprits for the critical skills shortage. General labourers did not know about the available career paths and career advancement opportunities. Construction Industry Review Committee (CIRC) (2001) stated that the poor image had made it difficult for construction companies to employ young people and retain those employed. A study conducted by Clarke and Boyd (2011) found that college and high school students felt that construction workers were dishonest and untrustworthy. Their study also revealed that school students (aged 7-18) had very little idea of what professionals did in construction. The poor perception of the industry was a factor which made a career in construction unattractive for the school students.

The lack of younger new entrants into the construction industry had caused the workforce to become an aging one (Haupt, et al., 2010). Due to a lack of interest in a career in construction, the proportion of older workers in the workforce had increased. Liska (2000) stated that there was a difference in how younger people and older people looked at jobs. Younger people were concerned about wages and status. Older people were more concerned about job security and "stationary work" (less travelling for work).

The construction industry was generally viewed as low-tech and labour intensive (Monese and Twala, 2009). The construction industry employed unskilled labour at low wages which added to the negative image of the industry (ILO, 2001).

The Construction Education and Training Authority (CETA), which was aimed at providing skills development in South Africa, had been suffering from corruption since 2007 (Mtshali, 2007). It was declared in 2011 that CETA would be under administration (Skills Portal, 2012). In 2012, CETA announced that R347m would be made available for skills development. Given the history of CETA, people were sceptical (Wait, 2012). How can skills be developed efficiently and at a high standard, if the authorities were suffering from corruption?

According to Chan and Connolly (2012), the shortage of skills had contributed to the growing concern of whether the future capacity of the construction industry could meet the future targets in terms of infrastructure and governmental plans. They concluded that efforts must be made to promote careers in construction at school level in order to employ and retain younger people in the industry (Chan and Connolly, 2012).

2.6 The plight of Construction Workers

The poor image of being a general labourer in construction has been justified by the truths of their living conditions. A high percentage of construction workers lived in poor conditions due to their low wages. A general construction worker during the construction of the Cape Town Stadium in Green Point in July 2009, had an average wage of R2,500 per month (Samara, 2009). The subsistence wage of that time was R4,000 per month (Building and Woodworkers International [BWI], 2009). Most construction workers lived in rural areas and were uneducated. The case study performed by Samara (2009) showed that this phenomenon was apparent in the Chinese, Indian and South African construction industries.

Maslow's hierarchy of needs is still seen as a prominent figure in motivational theory despite being created in 1943. He ranked the needs of people with the most basic needs at the bottom. He contended that once the lowest level or need has been satisfied, the person would address the fulfilment of the next level. The person would be motivated in achieving goals that would fulfil the need (Maslow, 1943). His hierarchy is illustrated in Figure 6.

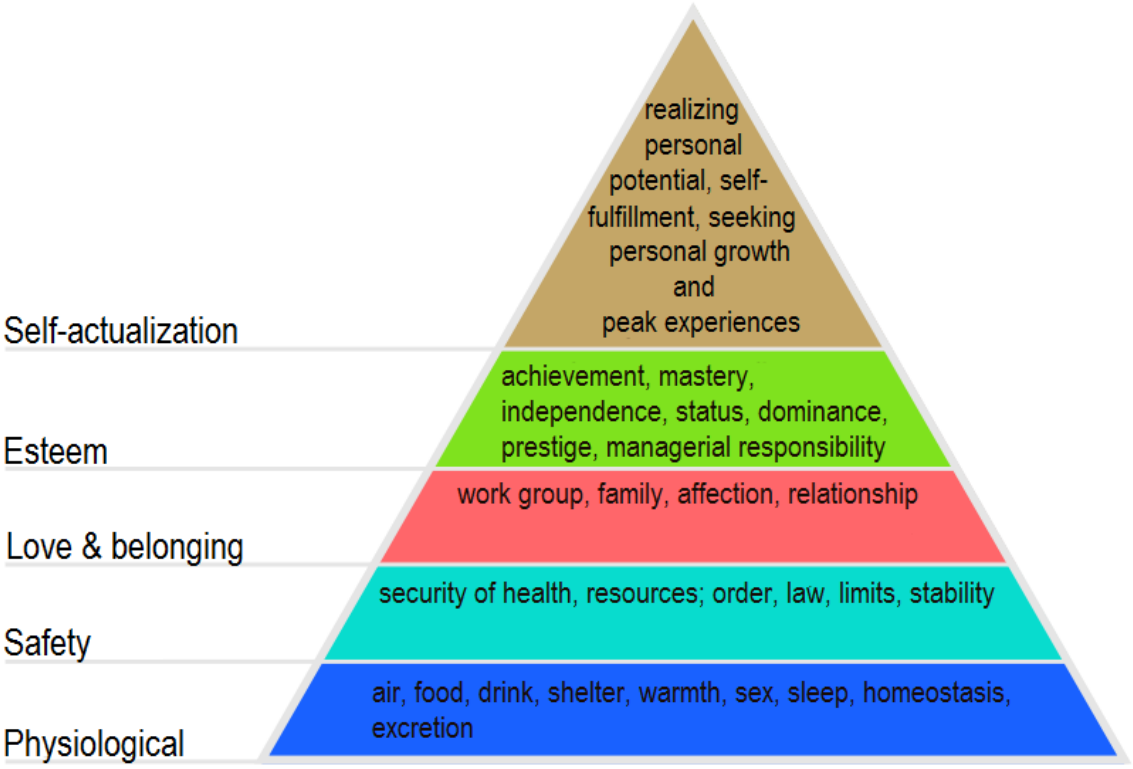

Figure 6 Maslow's hierarchy of needs (Achterberg, 2013)

It is of concern that construction workers were still concerned with fulfilling the two lowest levels of the hierarchy, such as food, shelter, employment, and security due to their low wage and the nature of their job. A survey conducted in Turkey by Parkin, Tutesigensi and Büyükalp (2009) showed that wages were the highest motivator and de-motivator among construction workers.

Construction companies have been experiencing difficulties in retaining their workforce due to the increased mobility of workers. Workers rarely stay with one employer during their career. Employers were forced to consider strategies to retain their skilled labour. Employers were encouraged to be actively involved in motivating their employees as skilled labour in construction was rare. Job hopping generally occurred because people wanted to keep their passion fresh or better career advancement opportunities at a different company (Nkomo and Twala, 2009).

2.7 A sustainable construction industry

Sustainability can be defined as the process of meeting the needs of the current generation without jeopardising the future generation's ability from achieving their needs. It can also be viewed as ensuring a higher quality of life in the future (Watermeyer, 2007). Sustainable

construction dealt with three aspects, namely "economic, environmental and social" (Watermeyer, 2007:27). A sustainable construction industry should therefore aim to achieve the current economic, environmental and social needs without deterring the ability of future generations from achieving their objectives.

There are generally four macroeconomic objectives every country pursues, namely "economic growth, full employment, price stability and balance of payments stability" (South African Reserve Bank [SARB], n.d.). As previously stated, the construction industry played a vital role in achieving economic growth. Economic growth could lead to job creation and thereby lower the unemployment rate and increase the quality of life (Parkin, Powell and Matthews, 2005; Lopes, 2009). Unemployment levels in South Africa have consistently been high which made it a socio-economic objective (SARB, n.d.). An increased number of SMEs in the construction industry could target the current unemployment problem (Department of Public Works, 1999). The Chartered Institute of Building (CIOB) (2010) stated that an increase in skilled employment could lead to a sustainable industry. Price stability refers to controlling inflation and it is currently an important monetary policy objective. In South Africa's economy, it is important to keep the balance of payments deficit as small as possible in order to keep the value of the currency in check (SARB, n.d.). A sustainable construction industry should aim at addressing these four macroeconomic objectives.

The earth does not enjoy infinite natural resources. The population is expected to grow immensely in the next decade and there is a worry that the resources will become depleted (Watermeyer, 2007). A lot of time and money has been recently on developing green building and renewable energy technologies. The renewable energy industry has grown internationally. According to the Middle East and North Africa (MENA) press release (2013), the renewable energy industry will grow 60-fold by the year 2030. Awareness of environmental sustainable construction has grown as more firms implemented strategies to reduce their environmental impact. The focus on environmentally sustainable construction has led to innovative construction techniques (Taylor, 2012). In South Africa every project needs an Environmental Impact Assessment (EIA) certificate before construction may begin on a site (Department of Environmental Affairs, 2010). The construction industry should take the lack of available resources into consideration in order to enjoy a sustainable industry in the future.

The construction industry employed around 7.8% of the total South African workforce (Statistics SA, 2012b). The construction industry could be used by government in combatting the current high unemployment levels. The government viewed the industry as a tool to increase the quality of life of the middle- and lower-class population. This could be achieved through economic growth, job creation and increased infrastructure (Didiza, 2008). In South Africa, the

government has been spending billions of rands on the construction of low-cost housing for the poor. In the 2009/2010 financial year, the government constructed 219,000 housing units and they planned on spending R16 billion on low cost housing in the following financial year (Department of Human Settlements, 2010). Unfortunately, the provincial governments have not spent more than R4 billion in the 2012/2013 financial year (Fokazi, 2013).

Watermeyer (2007) stated that the built environment would be much different in the decades to come than it is now. He contended that it would be through international standardisation that the industry can achieve sustainability.

2.8 Summary

This chapter explained the importance of the industry and why it should be kept healthy. The image of the industry was determined as per precious previous research and certain factors which influenced the image were identified. The current problem of critical skills shortage was researched in a South African and global context. The realities of working as a construction labourer were discussed and the requirements of a sustainable industry were identified. The following chapter sets out the methodologies the researcher used to obtain the data and how it was analysed.

CHAPTER 3 – RESEARCH METHODOLOGY

3.1 Introduction

The following chapter will introduce the concepts of research methodologies and their design and strengths and limitations. The population and sample together with sampling techniques are discussed and the chosen techniques are identified. The reliability and validity of the research findings were discussed and related to this study. The method of data analysis is discussed and the sources of measurement errors are identified and mitigated.

3.2 Research and the research process

Research has been defined as:

"a process that involves obtaining scientific knowledge by means of various objective methods and procedures." (Welman, Kruger and Mitchell, 2005:2).

The term "objective" referred to the fact that the "methods and procedures" were not subject to emotion or the respondents' opinions. "Methods and procedures" represented the manner in which research would be conducted, broken up into stages, for example, selecting a sample, data collection and analysis, and measuring validity and reliability. "Research methodology" referred to the method the researcher would use to conduct the research (*Ibid.*).

There are two main branches of research methodology, namely quantitative and qualitative research methodologies (*Ibid.*).

Quantitative research involved data which was objective and void of people's opinions and feelings (Welman, Kruger and Mitchell, 2005). The data collected were usually presented in numerical format, for example, graphs or statistics. Quantitative research was usually associated with the physical sciences where results could be physically seen. Quantitative research methodologies have been referred to as dealing with the "hard" sciences (Anderson, 2006).

According to Grobbelaar (2000), the scope of quantitative research was structured and universal in nature, which made it accurately definable. Quantitative research methodologies aimed at obtaining large numbers of responses. Large quantities of data could be imported into a software package aimed at analysing statistics and making sense of the data in the form of means, graphs, etc. Quantitative methodologies were generally structured and rigid in execution

as researchers aimed at establishing facts. Through the rigidity of quantitative methodologies, researchers could identify and isolate certain variables in order to note differences in the results (Welman, Kruger and Mitchell, 2005).

According to Quayle (2013), there were three steps to quantitative research:

- Find a way to measure the intended subject;
- Measure a sample related to the intended subject; and
- Use statistics to analyse and interpret the data collected and link it back to the theory.

Qualitative research was seen as the opposite to quantitative in that it dealt with data which was subjective. The data stemmed from the respondents' opinions and emotion (Welman, Kruger and Mitchell, 2005). Anderson (2006) stated that qualitative research methodologies dealt with the "soft" sciences. According to Grobbelaar (2000), Qualitative research was generally associated with the social sciences. The researcher was actively involved in the data collection by observing the respondents during the study and not by relying on measuring instruments used in quantitative research methodologies. The participants of qualitative research have generally been chosen by the researcher as opposed to a random selection of respondents (Grobbelaar, 2000).

Grobbelaar (2000) stated that qualitative research methodologies were not executed in a very strict manner as with quantitative research methodologies. An example of a less strict methodology includes unstructured interviews. In unstructured interviews, the researcher uses mainly open ended questions but still follows the predetermined order of the questions. Qualitative research usually dealt with more philosophical concepts, for example, how an object, or person, reacts under certain circumstances. Due to the researcher's active role during the data collection stage, sample sizes were significantly smaller than the quantitative counterpart (*Ibid.*).

When researchers used a combination of quantitative and qualitative methodologies, it was called triangulation. Researchers noticed that quantitative and qualitative research methodologies could be complimentary rather than critical. Triangulation was generally preferred as it was common that research methodologies which used only one method were lacking in validity and reliability (Grobbelaar, 2000). According to Anderson (2006:3), quantitative and qualitative research methodologies could be complimentary as could convert *"words to numbers and vice versa"* which allowed for added depth or a wider perspective in quantitative research.

The researcher sought to acquire data from a large sample to ascertain the viewpoints of certain large populations. Quantitative research methodologies were ideal for surveying larger samples simultaneously. Qualitative research methodologies were generally time consuming and only possible for smaller sample groups. However, as the research study dealt with the respondents' attitudes, it was important to include an element of qualitative research methodologies. Interviews comprising open questions were used to add depth to the data collected from the quantitative methodology.

3.3 Quantitative Research Methodology

3.3.1 Questionnaires

Questionnaires were the preferred method of data collection as part of surveys of students, employers and construction workers. The questionnaires had to be designed and subjected to pilot tests prior to being distributed among the samples.

The researcher conducted three surveys. The aim of the first questionnaire was to determine the students' perception of the industry and whether they thought a career in construction was a viable career choice. The second questionnaire surveyed employers in the construction industry in order to establish their views on the image of the industry, if they were experiencing shortages of labour and if they were participating in promoting the industry and their company at high school level. The third questionnaire was completed by construction workers themselves in order to justify some of the factors that were listed in the literature review.

3.3.2 Strengths and Limitations of Questionnaires

Questionnaires possess a great amount of strengths which made it a popular choice among researchers. However, questionnaires in general are not without fault and there are factors which limit their use. This section will highlight the strengths and limitations of questionnaires in general.

Questionnaires enjoy the following strengths:

- The researcher conducted group administration which resulted in a high response rate, a short data collection time and the researcher present to explain the purpose of the study and to answer any queries (Du Plooy, 2000);
- The pre-coded answers of a questionnaire made it easier for the researcher to capture and compare the data collected from a large number of respondents (Welman, Kruger and Mitchell, 2005);
- Questionnaires which were distributed via mail made it possible for the researcher to acquire responses from geographically dispersed areas in a relatively cost effective manner, especially in the instance of emails (Du Plooy, 2000); and
- The respondents of questionnaires could provide answers simultaneously whereas interviews must be conducted in a one-on-one manner (Adams and Cox, 2008).

Questionnaires suffer from the following limitations:

- In the case of closed questions, questionnaires may cause irritation as the respondents are limited to a selected number of responses (Welman, Kruger and Mitchell, 2005);
- Questionnaires that were posted to the respondents do not allow for follow up questions or the elaboration of responses further than what was allowed for (Du Plooy, 2000);
- Postal questionnaires generally have a low response rate at roughly 20% (Du Plooy, 2000);
- The respondents must be literate enough to be able to read and understand the questionnaires, which may be an issue in certain geographical areas in South Africa (Crossman, 2012);
- Respondents are not hurried in completing the questionnaires and they could take a long time to respond (Du Plooy, 2000); and
- The responses could be biased, inaccurate or the respondents could not take the questionnaire seriously (Du Plooy, 2000).

3.3.3 Questionnaire design

Questionnaires were common instruments in quantitative research. Questionnaires could be varied as there were numerous types of questions the researcher could include in a questionnaire.

Primarily, questions could be open or closed-ended. With open questions, the respondents wrote their own answer out, whereas closed-ended questions contained predetermined answers, for example yes/no questions.

Researchers, who required higher quality of responses, while still using closed-ended questions, would use paired-comparison questions. Herein, the respondents had to think more carefully and compare the available responses before selecting only one response.

The researcher could also use contingency questions that would only apply to some of the respondents. Depending on the respondents' answers to a question, they either qualified or not to answer some of the following questions. This method was also referred to as "Filtering". For example, if question 10 was a yes/no question, the respondents who answered "yes", would answer questions 11-15; and those who answered "no", would answer questions 16-20.

Respondents could also be asked ranking questions where they would have to rank the answers according to what they felt most strongly about in ascending or descending order. Inventory questions could be used where respondents ticked all options that applied to them.

The respondents could be subjected to multiple choice questions where they would only have to select one option. Researchers generally used this in obtaining information about the sample's profile (Du Plooy, 2000:186-188).

Questionnaires could also contain attitudinal scales. Likert scales were the most commonly used method. It required the respondents to indicate their level of agreement toward statements, the level a specific action influences them, or the level of importance regarding a statement. Some researchers could decide to provide the respondents with an even number of options. This technique would force the respondent to answer in the positive or negative as there was no option for "undecided".

Researchers could also opt to use a Semantic differential scale. These statements had opposite adjectives or adverbs (bipolar extremes) and a scale between them. The respondents were required to indicate the extent of their response to statements presented to them using the scale (Du Plooy, 2000:188-190).

When designing a questionnaire, it was important to consider the order of the questions and the length of the questionnaire. Du Plooy (2000) suggested that it was best to start with the general questions before going into specific topics. The questions should have been grouped into themes and follow a logical pattern. She (*Ibid.*) also suggested that any sensitive questions should be put in the middle of the questionnaire. It was important to keep the questionnaire to a reasonable length in order to avoid unreliable data stemming from a fatigued respondent. Welman, Kruger and Mitchell (2005) stated that questionnaires should be brief and concise.

The researcher conducted structured questionnaires which comprised of close ended questions. Close ended questions were used in lieu of open ended questions in order to expedite the

completion of the questionnaires as the samples consisted of high school students, who generally did not possess a large amount of free time during school time in order to complete the survey, and of employers and employees who had busy schedules (Welman, Kruger and Mitchell, 2005).

The majority of the high school questionnaire contained a 10-point Likert scale. A Likert scale was a common attitudinal scale as respondents generally knew how to answer on the scale (Redding, Maddock and Rossi, 2006). Likert scales allowed researchers to calculate central measures of tendency for each question in order to get a general summary of the sample's scoring (Van Eeden, 2000). The researcher could produce hierarchies of preferences which could then be compared. The points on the scale were equidistantly spaced which was a prerequisite for an accurate measurement. The two variants of the Likert scale the researcher used, was attitudinal scales and understanding scales.

An attitudinal scale was used to determine the respondents' attitudes towards statements mirroring characteristics of the construction industry. Point 1 on the scale represented strongly disagree whereas point 10 represented strongly agree. The mid-point between the two extremes was between points 5 and 6.

The employer and employee questionnaires contained attitudinal scales only. These scales were 5-point scales where the respondents were required to state their level of agreement towards statements presented to them. Whereas point 1 represented strongly disagree, point 5 represented strongly agree.

The understanding scale was used in establishing the high school students' level of knowledge about certain professions presented to them. This was also a 10-point scale similar to the attitudinal scale in their questionnaire.

The research instruments were designed to respond to the following questions, namely

- Does the construction industry have a poor image from the perspectives of high school students, and employers and employees currently employed in the industry?
- Do employers feel that there is currently a critical skills shortage?
- Is there a link between the image of the industry and the current skills shortage?
- Are high school students attracted to a career in construction?
- Does the lack of new entrants prevent companies from growing?
- Are employers currently involved in promoting the industry and careers therein?
- Does the lack of effort in promotion contribute to the industry's poor image?

The questionnaire had to be designed appropriately for the sample of respondents. Construction related jargon used in the questionnaire was kept to a minimum. The literacy level was expected to be basic as the respondents were high school students and some labourers may not have had an education. English was expected to be a second language for a substantial amount of respondents. The employers' questionnaire contained questions which were more in depth than the employees' questionnaire.

The students' questionnaire was broken up into 3 sections. The first section required the students to provide details about themselves, for example, gender, what school they attended, what grade they were in and if they knew someone who worked in the construction industry. Section 2 aimed at establishing what the high school students' attitudes were toward the industry. Section 2 comprised of 16 statements which required the respondents to score on a scale of 1 to 10 whether they agreed with the statement or not. The questions were worded positively and negatively in order to eliminate researcher bias or to influence the students' responses. The statements' scores were then ranked according to their mean with the statement which had the strongest agreement (highest mean) ranked first. Section 3 aimed at ascertaining how the students felt about a career in construction. How much did the students know about the job specifics of construction professionals and how attractive was a career in construction for them.

The employers' questionnaire required the respondent to provide their profession in order to create a profile of the sample. The employers were subjected to a number of statements which required them to state their level of agreement on a scale of 1 to 5. The statements aimed to establish the respondents' attitudes toward the image of the industry, if there is a link between the image and the skills shortage, their opinions regarding some of the factors from the previous chapter, whether they would encourage their children to join the industry and if they have been involved in promoting careers in the industry at high school level.

The questionnaire administered to general workers (labourers) provided a more comprehensive profile of the sample, requiring their profession, age and if they are employed full time or part time. They were presented with statements requiring a response using a Likert-type scale. A few of the factors were tested at worker level to determine whether they saw the industry as an attractive career and if they wanted to work where they did until they were old.

3.3.4 Pilot Study

The student questionnaire was piloted at a career day which was held by the KwaZulu-Natal branch of the Master Builders Association. The pilot study helped identify ambiguous sections in the questionnaire which caused confusion and needed clarification, and sections which needed to be reworded more simply. The variables remained unchanged and could be used in conjunction with the data collected after the pilot. The same questionnaire was used to survey additional students. Comparisons could be made between the students who attended the career fair and the students who attended the surveyed school. The students from the pilot study were referred to as "Sample A". A total of 27 students participated in the pilot study.

The employer and employee questionnaires were sent to a handful of respondents that were representative of the relevant sample. It was important to test the level of literacy and understanding of the general labourer. Suitable changes were made according to the findings before accepting the instrument.

3.3.5 Questionnaire Administration

Several schools were contacted where the researcher had personal connections and requested a meeting with the school's headmaster. The headmaster was given a copy of the questionnaire and the questionnaire consent form. The researcher stressed that all data collected would be regarded as anonymous and that data would be presented in numerical format in order to protect the students' reputations and avoid victimisation. The researcher administered the questionnaires to the sample in groups.

The researcher contacted numerous companies predominantly via email who were participating in the construction industry in the province of KwaZulu-Natal. A cover letter was attached to the emails which explained the purpose of the research, the purpose of the questionnaire, the respondent's role in the survey, the respondent's anonymity and the time it would take to complete the questionnaire. Upon completion of the employer questionnaires, the researcher asked these companies for permission to survey their employees.

3.4 Qualitative Research Methodology

Researchers used qualitative research methodologies in order to establish a general perception about a topic (Grobbelaar, 2000). There were numerous qualitative research methodologies researchers could have used in their studies:

- Researchers could have opted for case studies where a person, a group of people or a situation was studied in depth. In case studies, the sample size was generally small and it was important that the sample studied was representative of the intended population (Welman, Kruger and Mitchell, 2005:193).

- Researchers could have followed the participant observation methodology. Researchers who used this method generally wrote reports on the sample group while they themselves were subjected to the influences impacting on the sample group. In other words, the researcher experienced what the sample group experienced (Welman, Kruger and Mitchell, 2005:194).

- Researchers could have performed unstructured in-depth interviews. Unstructured interviews were mainly used in exploratory research. In exploratory research, it was often difficult to compile an interview schedule as the research areas were unknown (Welman, Kruger and Mitchell, 2005:197).

- Focus groups are another qualitative research methodology researchers used. In this method, small groups of people were interviewed. The group was presented with open questions and encouraged to express their opinions (Welman, Kruger and Mitchell, 2005:201).

3.4.1 Interviews

The qualitative method employed by the researcher was in the form of structured interviews. The interview questions were drawn up with the aid of the researcher's supervisor and co-supervisor.

The aim of the interview was to determine if the industry professionals felt that the construction industry had a poor image, what the impact of it was and if they felt that the critical skills shortage was linked to the poor image. The interviewees were asked whether they participated

in promoting the industry to young students. The researcher aimed at ascertaining the criteria of a sustainable industry in the eyes of industry professionals.

3.4.2 Interview Design

The researcher compiled a list of questions, known as an interview schedule, and conducted structured interviews. Welman, Kruger and Mitchell (2005) stated that the interviewer would stick to the wording and order of the questions as it was written in the interview schedule. They further stated that the interviewer would read the questions with the same vocal tone in order to eliminate bias. Leedy (1993) stated that the relatively uniform responses from structured interviews could be readily compared from interviewee to interviewee. The interviewer encouraged the interviewees to elaborate on their responses in order to obtain an in-depth response from the pre-coded questions.

The interviews aimed at achieving the following:

- It determined whether industry professionals felt that the construction industry had a poor image;
- It determined if firms suffered a severe skills shortage;
- It ascertained if the lack of new entrants hampered the growth of construction companies;
- It determined if construction companies are actively promoting the industry; and
- It determined if industry professionals felt that a lack of industry promotion contributed to its unattractiveness as a career choice and lack of knowledge of the industry.

3.4.3 Strengths and Limitations of Interviews

Interviews were a popular choice of conducting qualitative research. Interviews involved social contact between the interviewer and interviewee and were subject to influences also apparent in interpersonal communication (Du Plooy, 2000). Therefore, interviews, like interpersonal communication, have some advantages and disadvantages.

Interviews' advantages include:

- The researchers could obtain information they did not anticipate which could add a new perception to the research topic;
- Questions which have been stated ambiguously could be explained to the interviewee;

- The interviewer could ask follow up questions to obtain further information;
- The respondents did not have to be literate in order to be interviewed; and
- The researcher was able to observe the interviewee's body language in response to the questions (Du Plooy, 2000).

Interviews suffered from the following disadvantages:

- The interviewer could be biased in the stating of questions or the recording thereof which could deter the reliability of the data collected from interviews;
- It was timely and costly to conduct interviews as the interviewer had to travel in order to conduct the interviews; and
- Interviewers could not interview a large sample due to time constraints (Du Plooy, 2000).

3.5 Population and Sample

Van Rensburg (2000), stated that it was vitally important that the researcher clearly define the population, together with the criteria required to be a part of the target population. According to Welman, Kruger and Mitchell (2005), the sample was a part of a whole. In research, it was often impossible to include the entire population. For this reason, a sample was taken from the population which would be representative of the population. It was therefore important that the sample be carefully selected to obtain accuracy and confidence in extrapolating the sample to the population.

Sampling techniques could be divided into two types, namely probability and non-probability sampling. They were differentiated by the ability to determine the probability every person had in participating in the research. The following is a list of probability sample techniques:

- Simple random sample. In this method, each person had an equal amount of chance of being included in the sample (Welman, Kruger and Mitchell, 2005:59).
- Stratified random sample. Here, researchers divided the population into groups (strata), for example male and female. Researchers then took samples from the strata for their research. Stratified random samples provided researchers with the insurance that the sample was representative of the population. The sample size did not influence the sample's representativeness (Van Rensburg, 2000:155).
- Systematic sample. This technique required the researcher to assign numbers to each member of the population. Researchers obtained a sample by selecting a starting point

at random and then research every n^{th} member of the population until they reached their required sample size (Welman, Kruger and Mitchell, 2005:64).

- Cluster sample. This was used when the population was so large that it was impossible to get a list of each member in the population. In this method, the researchers would select a group at random with heterogonous (or overlapping) characteristics. This differs from stratified random sample as the latter contain homogenous strata (Welman, Kruger and Mitchell, 2005:65).

The following is a list of non-probability sample techniques:

- Accidental sample. This was the most convenient non-probability sampling technique. The members of the population were easily available for the researchers to include in their studies (Welman, Kruger and Mitchell, 2005:68),
- Quota sample. In this method, researchers aimed at drawing up the strata in proportion to the target population. For example, the population's male to female ratio was proportionate to the sample's male to female ratio (Welman, Kruger and Mitchell, 2005:68).
- Purposive sample. Researchers used their own discretion in selecting their sample based on their experience in previous research projects. As researchers were different and could follow different paths in drawing up their sample, it was often impossible to calculate the representativeness of their sample (Welman, Kruger and Mitchell, 2005:69).
- Snowball sample. In this method, researchers collected data from a few people in the target population, where after those individuals identified other individuals who could be included in the sample (Henning, Van Rensburg and Smit, 2004:71).
- Convenience sample. Researchers used this technique to survey *"easily accessible groups"*, such as individuals at a shopping mall. They continued until they reached the desired sample size (Van Rensburg, 2000:160; Welman, Kruger and Mitchell, 2005:69).

The questionnaires required the identification of three groups of populations. For the student questionnaire, the researcher identified the population as "young adults". The age group was typically from ages 15 to 19. The questionnaire was aimed at recording the young adults' attitude toward construction and the careers therein. At the age of 15 to 19, young people were typically encouraged to think and decide upon their ultimate career choice. The employer questionnaire's sample was the various employers currently active in the construction industry in KwaZulu-Natal. The employers covered the multitude of professions available in the

industry, including general contracting companies, civil engineering practices, consulting practices, and architectural and quantity surveying firms. The employee questionnaire's target population was the labourers of companies who participated in the industry. They included general labourers, tradesmen, operators and apprentices.

The researcher identified the sample as high school students who were in grades 10, 11 and 12. There were on average 200 students between grades 10 and 12 per school, and 7 high schools in the geographical area of this study. The total population size was roughly 1400. The sample size of the selected sample was 170 students. The sample comprised of roughly 12% of the total population. The sample included both male and female students in order to examine if there was a difference between the sexes in perception and attraction to the construction industry. Students had at this stage to start to evaluate possible career paths and apply to institutes of further education. The researcher employed a non-probability sampling technique. In non-probability sampling there was an uncertainty that each element of the sample was included in the sample (Van Rensburg, 2000). The researcher made use of convenience sampling when conducting the pilot study at the Master Builders Association's career fair. Students from ten schools were present at the career fair. The second sample was selected by the researcher implementing purposive sampling techniques. The school surveyed was purposely selected as it was representative of the majority of the schools in the Greater Durban area in KwaZulu-Natal. Therefore, the students from this school were representative of the students from the schools in the same geographical area. The school had students from both genders and the majority were bilingual (Afrikaans and English or Zulu and English). The school drew its students from the western suburbs outside Durban, from Westville to Hillcrest, a total of roughly 195.74 km^2 (76.11 sq. mi) (Republic of South Africa, 2011).

The researcher also employed convenience sampling techniques in the case of the employer and employee samples. Personal contacts as well as a list of companies made available on the Master Builders Association website were utilised in order to boost responses. All companies contacted were also sent an example of the employee questionnaire and asked for permission to survey their staff.

There were roughly 150 construction companies that were registered with the Master Builders Association KwaZulu-Natal branch. The researcher contacted a total of 116 construction companies located in the Greater Durban area in KwaZulu-Natal via email and hardcopy delivered questionnaires. Of the 116 companies, 36 responses were collected from the construction companies showing a response rate of 31%. Of those 36 companies, 6 contracting companies gave the researcher permission to survey their construction workers. A total of 28

construction workers consented to participate in the study of a possible 35, showing a response rate of 80%.

The researcher identified the population to be interviewed as industry stakeholders. “Industry stakeholders” refer to every professional who was a part of the built environment from the client to the professional team. The heads of contracting companies and engineering consultant firms were interviewed in order to establish if labour shortages were experienced and the average age of the current workforce. In order to qualify, the interviewees had to have over 20 years’ experience in the construction industry and be an employer to a company conducting multi million rand projects. Four (4) industry stakeholders were interviewed.

3.6 Reliability and Validity

Welman, Kruger and Mitchell (2005) stated that reliability dealt with the credibility of the findings. In other words, if the same respondent answered the same questionnaire twice, the scores would be similar. Therefore, the date of administration should not affect the responses obtained on that date. Reliability was not measured, it was estimated (Portland State University, n.d.). Portland State University (n.d.) stated that there were usually two methods of estimating reliability, namely, test-retest and internal consistency.

Test-retest reliability required the researcher to conduct the survey twice to one sample of respondents but on two different dates. Due to the researcher’s time constraints, the size of the sample and the logistical complications of surveying various schools for a second time, it was impossible to conduct test-retest reliability.

Internal consistency involved including questions that tested the same themes at two different points in the survey. The responses were then correlated to see if they resulted in the same response. Unlike test-retest reliability, internal consistency required the survey to be administered once. The researcher provided for internal consistency in the questionnaire by asking in two different sections if the respondents felt that the construction industry enjoyed a positive or negative image. The image of the industry was central to this study and all hypotheses involved which made it an important topic to test the reliability of the findings. After analysing the data collected from the three different questionnaires, internal consistency was confirmed by comparing the responses from the similar questions at different locations on the questionnaires.

Validity referred to whether the researcher measured what was supposed to be measured (Du Plooy, 2000). Portland State University (n.d.) stated that there were generally four types of validity examined by researchers:

- Conclusion validity examined the relationship between the *"programme"* (the image of the industry) and the *"outcome"* (resultant lack of new entrants in the industry) (Portland State University, n.d.:2).
- Internal validity examined if the outcome was caused by the programme (Portland State University, n.d.:2). In other words, was the lack of new entrants caused by the industry's poor image? The researcher aimed to prove that there was a link between the image of the industry and its attractiveness as a career choice which caused a lack of entrants into the industry and the resultant skills shortage.
- Construct validity required that *"the instrument we use to measure the variable must measure that which it is supposed to measure"* (Welman, Kruger and Mitchell, 2005:142). It was important that conclusions were drawn conclusions from what was set out to measure.
- External validity examined if the findings of the sample could be extrapolated over the entire population (Portland State University, n.d.:2). Can the findings be representative of the population? The sample of the questionnaire was representative of schools in the KwaZulu-Natal province, which made it difficult to extrapolate over the other provinces in South Africa. Each province has a Master Builders Association branch that independently campaigned to improve the image of the industry to the client and to students as a viable career choice. The success of these campaigns would differ from one province to the other, making it difficult to state that what was true for one province was true for the other.

The researcher identified the industry's poor image as the independent variable and the lack of new entrants as the dependent variable. The researcher acknowledged the existence of other factors which contributed to the dependent variable (lack of new entrants). The questionnaires were formulated by testing the factors which contributed to the poor image as opposed to other possible causes for the lack of new entrants and skills shortage. This excluded influences from other factors on the dependent variable. The internal validity was not threatened as there was a direct relationship between the independent and dependent variables.

3.7 Data Analysis

Upon completion of the questionnaires by the samples, the researcher captured the data using IBM SPSS version 21. Measures of central tendency were determined. Scaled responses were ranked by their means. Questions that were directly related to the testing of the hypotheses were given special attention.

By means of content analysis, the EXCEL software package was used to draw inferences from the qualitative responses using thematic groupings.

3.8 Sources of Measurement Error

There is a possibility that the respondents may have provided unreliable data during the completion of the questionnaire. This could occur with or without mal-intent. There were generally two sources of measurement error, namely systematic error and random error (Du Plooy, 2000). Systematic error generally occurred when the respondents gave false data in order to create a favourable impression of them. Respondents could provide biased data which could distort the results of the measurement. The data they provided could result in a lack of construct validity or the researcher failing to measure what was intended to measure. It is possible for the researcher to employ strategies to minimise the possibility of biased responses, for example, gaining the trust of the respondents. This error was the result of the respondents' conscious decision to provide false data (*Ibid.*).

In contrast, random error could occur without the intention of the respondent. Random errors occurred by chance but it was possible that these could be cancelled out by increasing the sample size. Du Plooy (2000:172) gave the following four examples of when random error could occur:

- The respondents could be tired or feel ill;
- The researcher could seem intimidating or threatening to the respondent;
- The researcher could have a brief lapse of concentration; and
- The researcher's equipment, such as a voice recorder, could malfunction.

3.9 Summary

This chapter detailed the methodologies that were used. It identified the target populations and samples that participated in this research, and the compilation of the questionnaires and

interview schedule. In the following chapter, the researcher analysed the data collected and tested the hypotheses.

CHAPTER 4 – DATA COLLECTION AND ANALYSIS

4.1 Introduction

The following chapter contains the research findings after the raw data has been coded and analysed. The chapter is divided into four sections that deals with each research instrument used. Each section compares the findings to the factors that contributed to the industry's poor image as outlined in the literature review (Chapter 2).

Data is gathered using many strategies and methods. However, data in itself has no value unless it is subjected to analysis and the outcomes of this analysis correctly interpreted for conclusions to be drawn. Researchers analysed the coded data in order to identify trends and general viewpoints of participants which could be extrapolated over the target population.

4.2 Student perceptions

4.2.1 High School Sample Profile

There were two high school samples, namely Sample A (students who participated in the Master Builders Association career fair), and Sample B (students who attended the representative school). Table 1 shows the size of the two samples.

Table 1 Sample size

Sample	N	Percent
Sample A	27	15.88%
Sample B	143	84.12%
Total	170	100.00%

The sample consisted of students in grades 10 to 12, which by inference suggests an age grouping of 15 to 18 years. It was expected that it was during this time that high school students were exposed to and considering the various career possibilities available to them. In South Africa, it was ideal to start applying to institutes of further education when the student was in grade 11. It was expected that:

- Students in grade 10 had been introduced to various possible careers;

- Students in grade 11 should have spent some time discussing possible career paths with career advisors, family and friends; and
- Students in grade 12 should have had a clearer idea of what each career path entails and which career they intend to follow. If they intended to study after school, they ought to have applied to institutes of further education.

Table 2 shows the distribution of the sample over the three grades and its distribution across the two samples. The majority of the respondents were in grades 10 and 11. It was expected that the majority of the respondents would have been introduced to the careers available to them and had been discussing possible career paths with friends, relatives and teachers or career advisers. However, 29% of the respondents were in grade 12, their final school year. They should have applied for further education and decided on a possible career path. They would have weighed the pros against the cons about careers in different industries.

Table 2 Grade and Sample Cross Tabulation

Grade	Sample		Total
	Sample A	Sample B	
Gr 10	9 (33.3%) *(15.3%)*	50 (35%) *(84.7%)*	59 (34.7%) *(100%)*
Gr 11	14 (51.9%) *(23%)*	47 (32.9%) *(77%)*	61 (35.9%) *(100%)*
Gr 12	4 (14.8%) *(8%)*	46 (32.1%) *(92%)*	50 (29.4%) *(100%)*
Total	27 (100%) *(15.9%)*	143 (100%) *(84.1%)*	170 (100%) *(100%)*

*Note: The italicised percentages represent the proportions within each grade whereas the non-italicised percentages represent the proportions within each sample.

The sample had a relatively equal gender distribution, as indicated in Table 3, but there were more female respondents (54%). With the recent attempts to eradicate the male dominancy in the industry, it was important to establish the views of female students. It was important to determine whether young women were prejudiced against careers in construction. Sample A had more male respondents (63%). Table 3 shows the gender distribution across the two samples.

Table 3 Gender and Sample Cross Tabulation

Gender	Sample		Total
	Sample A	Sample B	
Male	17 (63%) *(21.5%)*	62 (43.4%) *(78.5%)*	79 (46.5%) *(100%)*
Female	10 (37%) *(11%)*	81 (56.6%) *(89%)*	91 (53.5%) *(100%)*
Total	27 (100%) *(15.9%)*	143 (100%) *(84.1%)*	170 (100%) *(100%)*

*Note: The italicised percentages represent the proportions within the gender whereas the non-italicised percentages represent the proportions within each sample.

Table 4 shows the gender distribution across the three grades. There were more female than male students in grades 10 (64.4%) and 12 (58.0%).

Table 4 Gender and Grade Cross Tabulation

Gender	Grade			Total
	Gr 10	Gr 11	Gr 12	
Male	21 (35.6%) *(26.6%)*	37 (60.7%) *(46.8%)*	21 (42.0%) *(26.6%)*	79 (46.5%) *(100%)*
Female	38 (64.4%) *(41.8%)*	24 (39.3%) *(26.3%)*	29 (58.0%) *(31.9%)*	91 (53.5%) *(100%)*
Total	59 (100%) *(34.7%)*	61 (100%) *(35.9%)*	50 (100%) *(29.4%)*	170 (100.0%) *(100%)*

*Note: The italicised percentages represent the proportions within each gender whereas the non-italicised percentages represent the proportions within each grade.

The respondents were asked to indicate whether they knew someone working in the construction industry. Their responses are shown in Table 5. It can be expected that respondents who knew someone in the industry would have a perception of the industry based on the actual experiences of that person. One might also expect that these respondents would have a greater knowledge of the inner workings of the industry. The majority of the students knew someone who worked in the construction industry. The majority of the students knew someone who worked in the construction industry (65%). Two-thirds (67%) of the students in Sample A reported that they knew someone who worked in the construction industry. In Sample B, 65% of the students indicated that they knew someone working in construction.

Table 5 Source and Sample Cross Tabulation

Source	Sample		Total
	Sample A	Sample B	
Yes	18 (66.7%) *(16.2%)*	93 (65%) *(83.8%)*	111 (65.3%) *(100%)*
No	9 (33.3%) *(15.3%)*	50 (35%) *(84.7%)*	59 (34.7%) *(100%)*
Total	27 (100%) *(15.9%)*	143 (100%) *(84.1%)*	170 (100%) *(100%)*

*Note: The italicised percentages represent the proportions within each response category whereas the non-italicised percentages represent the proportions within each sample.

Table 6 shows the percentage of how many students knew someone working in the industry, distributed across gender. In general, more female students knew someone working in construction than their male counterparts (53%).

Table 6 Gender and Source of information Cross Tabulation

Gender	Source of information		Total
	Yes	No	
Male	52 (46.8%) *(65.8%)*	27 (45.8%) *(34.2%)*	79 (46.5%) *(100%)*
Female	59 (53.2%) *(64.8%)*	32 (54.2%) *(35.2%)*	91 (53.5%) *(100%)*
Total	111 (100%) *(65.3%)*	59 (100%) *(34.7%)*	170 (100%) *(100%)*

*Note: The italicised percentages represent the proportions within the gender whereas the non-italicised percentages represent the proportions within each response category.

When asked who this person was, the respondents responded as shown in Table 7. It could be expected that the respondents with family members such as a parent, sibling or uncle in the industry would have had a higher degree of knowledge about the industry than those with merely a friend in the industry or those who answered with “other” or “none”.

Table 7 Source of influence/information

Source	N	Percent
Parent	27	15.88%
Sibling	8	4.71%
Uncle	18	10.59%
Friend	27	15.88%
Other	31	18.24%
None	59	34.70%
Total	170	100.00%

It is worth noting that 31% of the respondents had a family member currently employed in the construction industry. These respondents were expected to know more about the industry than the other groupings. About a third of the respondents (34%) knew someone who was employed in construction but these were friends or acquaintances of the respondents. These respondents were expected to have some knowledge of the industry. In contrast, 35% of the respondents did not know anyone working in construction and they were expected to know the least about the inner workings of the industry.

4.2.2 Attitudes toward careers in construction

The high school students were presented with 16 statements on their attitudes towards careers in the construction industry which required them to respond according to a Likert scale of 1 to 10, where 1 represented strongly disagree and 10 strongly agree. The responses of the students were ranked according to their means as shown in Table 8.

Table 8 Students' attitudes toward careers in Construction (ranked by means)

Statements	N	Scale										Mean	Std. Dev.	Rank
		1	2	3	4	5	6	7	8	9	10			
There are a lot of problem solving opportunities in construction projects.	170 (100%)	2 (1.1%)	4 (2.4%)	5 (2.9%)	9 (5.3%)	33 (19.4%)	20 (11.8%)	19 (11.2%)	27 (15.9%)	19 (11.2%)	32 (18.8%)	6.98	2.277	1
Construction is not an industry suited for disabled persons.	170 (100%)	12 (7.1%)	6 (3.5%)	8 (4.7%)	12 (7.1%)	18 (10.6%)	11 (6.5%)	15 (8.8%)	20 (11.8%)	20 (11.8%)	48 (28.2%)	6.92	2.911	2
A career in the construction industry is fulfilling as results can be seen.	170 (100%)	1 (0.6%)	1 (0.6%)	7 (4.1%)	7 (4.1%)	30 (17.6%)	22 (12.9%)	38 (22.4%)	26 (15.3%)	15 (8.8%)	23 (13.5%)	6.90	1.990	3
The construction industry pays well.	170 (100%)	1 (0.6%)	5 (2.9%)	4 (2.4%)	11 (6.5%)	36 (21.2%)	32 (18.8%)	29 (17.1%)	33 (19.4%)	9 (5.3%)	10 (5.9%)	6.39	1.879	4
A career in the construction industry is rewarding.	170 (100%)	0 (0.0%)	2 (1.1%)	4 (2.4%)	10 (5.9%)	50 (29.4%)	29 (17.1%)	32 (18.8%)	17 (10.0%)	14 (8.2%)	12 (7.1%)	6.39	1.805	5
The construction industry enjoys a positive image.	170 (100%)	3 (1.8%)	2 (1.1%)	12 (7.1%)	16 (9.4%)	42 (24.7%)	19 (11.2%)	22 (12.9%)	24 (14.1%)	8 (4.7%)	22 (12.9%)	6.29	2.241	6
The construction industry is a male dominated industry.	170 (100%)	24 (14.1 %)	9 (5.3%)	17 (10.0%)	6 (3.5%)	23 (13.5%)	12 (7.1%)	14 (8.2%)	26 (15.3%)	21 (12.4%)	18 (10.6%)	5.76	3.008	7
A career in the construction industry is prestigious	170 (100%)	7 (4.1%)	1 (0.6%)	8 (4.7%)	17 (10.0%)	65 (38.2%)	24 (14.1%)	21 (12.4%)	16 (9.4%)	2 (1.2%)	9 (5.3%)	5.61	1.910	8

Table 8 Continued.

Statements	N	Scale										Mean	Std. Dev.	Rank
		1	2	3	4	5	6	7	8	9	10			
Working in the construction industry is unsafe.	170 (100%)	9 (5.3%)	4 (2.4%)	18 (10.6%)	12 (7.1%)	58 (34.1%)	21 (12.4%)	18 (10.6%)	15 (8.8%)	4 (2.4%)	11 (6.5%)	5.45	2.170	9
A job in an office pays more than a job on site.	170 (100%)	23 (13.5%)	7 (4.1%)	16 (9.4%)	20 (11.8%)	47 (27.6%)	12 (7.1%)	11 (6.5%)	11 (6.5%)	4 (2.4%)	19 (11.2%)	5.08	2.674	10
It is better to work in an office than it is to work outside on site.	170 (100%)	33 (19.4%)	10 (5.9%)	18 (10.6%)	16 (9.4%)	37 (21.8%)	11 (6.5%)	7 (4.1%)	6 (3.5%)	12 (7.1%)	20 (11.8%)	4.86	2.967	11
The construction industry is too physically demanding.	170 (100%)	18 (10.6%)	9 (5.3%)	22 (12.9%)	22 (12.9%)	48 (28.2%)	18 (10.6%)	13 (7.6%)	11 (6.5%)	3 (1.8%)	6 (3.5%)	4.73	2.221	12
There are less career advancement opportunities in the construction industry.	170 (100%)	21 (12.4%)	14 (8.2%)	21 (12.4%)	23 (13.5%)	40 (23.5%)	10 (5.9%)	20 (11.8%)	11 (6.5%)	3 (1.8%)	7 (4.1%)	4.64	2.382	13
A career in the construction is better than a career in other industries.	170 (100%)	22 (12.9%)	17 (10.0%)	24 (14.1%)	26 (15.3%)	49 (28.8%)	9 (5.6%)	10 (5.9%)	7 (4.1%)	2 (1.2%)	4 (2.4%)	4.21	2.126	14
There are not many jobs available in construction	170 (100%)	29 (17.1%)	17 (10.0%)	19 (11.2%)	15 (8.8%)	50 (29.4%)	16 (9.4%)	11 (6.5%)	9 (5.3%)	3 (1.8%)	1 (0.6%)	4.19	2.189	15
There is no corruption in the construction industry.	170 (100%)	43 (25.3%)	28 (16.5%)	24 (14.1%)	11 (6.5%)	31 (18.2%)	15 (8.8%)	7 (4.1%)	6 (3.5%)	1 (0.6%)	4 (2.4%)	3.56	2.320	16

According to Table 8, the highest mean was 6.98 (There are a lot of problem solving opportunities in construction projects) and the lowest was 3.56 (There is no corruption in the construction industry). The mean responses to ten statements were above 5.00 suggestive that the students tended to be undecided or unsure about most of the aspects of the industry presented to them in the various statements.

The students felt most strongly about there being numerous problem solving opportunities in construction projects (mean=6.98), a career in construction is not suitable for disabled persons (mean=6.92) and a career in construction being fulfilling as their results could be seen (mean=6.90).

In contrast, the students disagreed the most with statements that there was no corruption in the construction industry (mean=3.56), there were not many jobs available in construction (mean=4.19) and a career in construction was better than a career in other industries (mean=4.21).

Students were undecided about whether a career in construction was prestigious (mean=5.61) despite agreeing that jobs and career advancement opportunities were available and paying well, about construction being a male dominated industry (mean=5.76), construction work being unsafe (mean=5.45) and construction jobs were better paid (mean=5.08). They were also neutral about construction activities being physically demanding (mean=4.73), and that working in an office was better than working on site (mean=4.86).

While the students felt that the industry enjoyed a positive image (mean=6.29), careers were fulfilling (mean=6.90), rewarding (mean=6.39) and well paid (mean=6.39) they were still reluctant to consider the industry as a viable career choice.

4.2.3 Comparisons within the High School sample

Table 9 Gender means comparison

Statements	Gender							
	Male				Female			
	Mean	N	Std. Dev.	Rank	Mean	N	Std. Dev.	Rank
There are a lot of problem solving opportunities in construction projects.	7.22	79	2.263	1	6.77	91	2.281	2
A career in the construction industry is fulfilling as results can be seen.	7.08	79	1.986	2	6.75	91	1.992	3
Construction is not an industry suited for disabled persons.	6.86	79	2.982	3	6.98	91	2.863	1
A career in the construction industry is rewarding.	6.56	79	1.685	4	6.24	91	1.899	6
The construction industry pays well.	6.53	79	1.894	5	6.27	91	1.868	4
The construction industry enjoys a positive image.	6.33	79	2.129	6	6.25	91	2.346	5
The construction industry is a male dominated industry.	5.75	79	2.794	7	5.77	91	3.197	8
A career in the construction industry is prestigious.	5.57	79	1.879	8	5.64	91	1.947	9
A job in an office pays more than a job on site.	5.20	79	2.743	9	4.97	91	2.622	12
Working in the construction industry is unsafe.	5.05	79	1.887	10	5.80	91	2.344	7
It is better to work in an office than it is to work outside on site.	4.35	79	3.017	11	5.31	91	2.866	10
There are less career advancement opportunities in the construction industry.	4.32	79	2.570	12	4.92	91	2.182	13
The construction industry is too physically demanding.	4.30	79	2.168	13	5.10	91	2.211	11
A career in the construction is better than a career in other industries.	4.25	79	2.169	14	4.16	91	2.099	15
There are not many jobs available in construction	3.76	79	2.254	15	4.56	91	2.072	14
There is no corruption in the construction industry.	3.28	79	2.075	16	3.81	91	2.498	16

Table 9 shows the difference in means according to gender. While in most cases the difference in means was not much different between the sexes, the ranking of their responses differed markedly. While males regarded there being a lot of problem solving opportunities in construction projects highest (mean=7.22), their female counterparts ranked it second (mean=6.77). Males ranked a career in construction as being fulfilling as their results could be seen second (mean=7.08) while females ranked it third (mean=6.75). Males ranked careers in the construction industry as not being suited to disabled persons third (mean=6.86), while this statement ranked highest with female students (mean=6.98).

Males and females ranked no corruption being present in the industry lowest at 16th (male mean=3.28; female mean=3.81). The male respondents disagreed with jobs not being available in construction and ranked it 15th (mean=3.76), whereas the female respondents ranked it 14th (mean=4.56). The male students disagreed about a career in construction being better than a career in other industries, and ranked it 14th (mean=4.25). The female students ranked this statement 15th (mean=4.16).

The males ranked a job in an office paid more than a job on site as 9th (mean=5.20) while the females ranked it 12th (mean=4.97). The female students felt more strongly that office jobs were better paid in comparison to jobs on site than the male students. Anecdotal evidence suggests that females tended to gravitate towards jobs off site such as in an office whereas males tended to prefer onsite work more. Males ranked working on construction sites as being unsafe 10th (mean=5.05) while this statement was ranked 7th by the females (mean=5.80). The females were more concerned and aware of the threats to their health and safety in their working environment than males.

The rankings showed that there were indeed differences in opinions between the male and female students. The more neutral responses of female students could suggest that the male students were more exposed to and knowledgeable about careers in construction than they were.

Table 10 Familiarity means comparison

Statements	Familiarity							
	Students who knew someone in construction				Students who did not know someone in construction			
	Mean	N	Std. Dev.	Rank	Mean	N	Std. Dev.	Rank
Construction is not an industry suited for disabled persons.	7.28	111	2.701	1	6.25	59	3.187	5
There are a lot of problem solving opportunities in construction projects.	7.21	111	2.253	2	6.54	59	2.277	1
A career in the construction industry is fulfilling as results can be seen.	7.12	111	1.929	3	6.49	59	2.054	2
The construction industry pays well.	6.45	111	1.808	4	6.29	59	2.018	4
A career in the construction industry is rewarding.	6.43	111	1.924	5	6.31	59	1.567	3
The construction industry enjoys a positive image.	6.35	111	2.361	6	6.17	59	2.01	6
The construction industry is a male dominated industry.	5.79	111	3.054	7	5.69	59	2.943	9
A career in the construction industry is prestigious.	5.52	111	2.097	8	5.76	59	1.501	8
Working in the construction industry is unsafe.	5.23	111	2.153	9	5.86	59	2.161	7
A job in an office pays more than a job on site.	4.95	111	2.592	10	5.31	59	2.83	10
It is better to work in an office than it is to work outside on site.	4.76	111	3.025	11	5.07	59	2.87	11
The construction industry is too physically demanding.	4.63	111	2.161	12	4.92	59	2.336	12
There are less career advancement opportunities in the construction industry.	4.61	111	2.577	13	4.69	59	1.985	13
A career in the construction is better than a career in other industries.	4.14	111	2.219	14	4.32	59	1.951	14
There are not many jobs available in construction	4.14	111	2.404	14	4.27	59	1.73	15
There is no corruption in the construction industry.	3.55	111	2.327	16	3.59	59	2.328	16

Table 10 shows comparison of the views of those students who knew someone who was working in the construction industry and those who did not. It is evident that students who knew someone in the sector had slightly stronger views than those who did not reflected in the means of their responses to most of the statements being higher.

The students who knew someone working in the construction industry agreed the most with the following statements, with means ranking the highest: careers in construction were not suited for disabled persons (mean=7.28), there was a lot of problem solving opportunities in construction (mean=7.21), and careers in construction was fulfilling (mean=7.12). However, the students who did not know someone in construction ranked the statement regarding careers in construction not being suitable for disabled persons 5th (mean=6.25). They felt most strongly about there being problem solving opportunities in construction and ranked it first (mean=6.54). They also felt that careers in construction were fulfilling as their results could be seen and ranked it second (mean=6.49).

There were minor differences in the rankings of the various statements between those students who knew someone in the industry and those who did not. However, while those who knew someone ranked construction as an industry not suited for disabled persons highest of all the issues, those who did not know anyone in the industry ranked this issue fifth. It is likely that students knew someone in the industry who was disabled while the others did not and therefore the difference in ranking of this statement. It is evident that knowing someone in construction had little influence on the ranking of the various statements except for the one about persons with disability.

Table 11 Comparison of views of different samples using means

Statements	Sample							
	Sample A				Sample B			
	Mean	N	Std. Dev.	Rank	Mean	N	Std. Dev.	Rank
A career in the construction industry is fulfilling as results can be seen.	7.89	27	1.601	1	6.71	143	2.006	3
There are a lot of problem solving opportunities in construction projects.	7.48	27	2.532	2	6.88	143	2.222	2
The construction industry is a male dominated industry.	7.15	27	2.597	3	5.50	143	3.016	9
A career in the construction industry is rewarding.	6.78	27	1.717	4	6.31	143	1.817	5
The construction industry pays well.	6.67	27	1.840	5	6.34	143	1.888	4
The construction industry enjoys a positive image.	6.59	27	1.716	6	6.23	143	2.328	6
Construction is not an industry suited for disabled persons.	5.70	27	2.880	7	7.15	143	2.869	1
A career in the construction industry is prestigious.	5.22	27	2.486	8	5.68	143	1.783	7
It is better to work in an office than it is to work outside on site.	5.22	27	2.991	8	4.80	143	2.968	12
A career in the construction is better than a career in other industries.	4.89	27	1.476	10	4.08	143	2.208	15
Working in the construction industry is unsafe.	4.81	27	2.466	11	5.57	143	2.098	8
A job in an office pays more than a job on site.	4.59	27	3.054	12	5.17	143	2.597	10
The construction industry is too physically demanding.	4.37	27	2.589	13	4.80	143	2.148	12
There is no corruption in the construction industry.	3.85	27	2.265	14	3.51	143	2.334	16
There are less career advancement opportunities in the construction industry.	3.41	27	2.791	15	4.87	143	2.232	11
There are not many jobs available in construction	2.81	27	1.882	16	4.45	143	2.152	14

From Table 11, while the differences in means are not that great the rankings are very different. The students in Sample A agreed the most with the following statements, with means ranking the highest: careers in construction were fulfilling as their results could be seen (mean=7.89), there were a lot of problem solving opportunities in construction projects (mean=7.48) and that

the construction industry was male dominated (mean=7.15). The students from the representative school (Sample B) ranked the following statements the highest: the industry was not suited for disabled persons (mean=7.15), there were many problem solving opportunities on construction projects (mean=6.88) and construction careers were fulfilling as their results could be seen (mean=6.71).

With the majority of both samples' means being in the neutral zone of the scale, it reiterates the students' lack of knowledge about the industry. The students from Sample A, who were subjected to presentations promoting the industry and careers therein, still felt that the industry was male dominated (mean=7.15).

The students in Sample A disagreed the most with the following statements which resulted in them being ranked the lowest: there were not many jobs available in construction (mean=2.81), there were few career advancement opportunities in construction (mean=3.41) and there were no corruption in construction (mean=3.85). In comparison, the students from the representative sample disagreed the most about there being no corruption in the construction industry (mean=3.51), a career in construction was better than a career in other industries (mean=4.08), and there were not many jobs available in construction (mean=4.45).

The students from Sample A felt that that the construction industry was male dominated and ranked it 3rd, while the students from Sample B ranked it 9th. While Sample B had more female than male students, they did not think that the industry was male dominated. Interestingly, the students in Sample A did think that the industry was male dominated possibly due to not being exposed during the career fair to the prospects for females in the sector.

Students in Sample A ranked careers in construction as not being suited for disabled persons 7th while it was ranked highest by Sample B. The students, who attended the career fair, could have been exposed to promotion regarding the ability for persons with disabilities to work in the industry. However, students in Sample B felt strongest about this statement.

The students from Sample A ranked careers in construction being better than careers in other industries as 10th whereas it was ranked 15th by students in Sample B. It could suggest that the career fair has influenced some of the students and made careers more attractive to them. The students from the representative school did not think that a career in construction was better than in other industries.

Students in Sample A ranked working on construction sites as being unsafe 11th while students in Sample B ranked it 8th. It is possible that the career fair addressed the issue of the industry's poor health and safety record and demonstrated to the students that working in the industry

were safer than they might have thought. Students in Sample B thought that the industry was unsafe.

The students from Sample A ranked there being few career advancement opportunities in construction 15th whereas it was ranked 11th by students in Sample B. It is suggestive that the career fair has exposed the students from Sample A to the various career advancement opportunities in the industry. Students in Sample B were more pessimistic about construction career opportunities.

In general, it is apparent that the career fair did have an influence on the views of students. Some of the negative characteristics were ranked higher than the rankings from the students from Sample B who had not attended the fair.

4.2.4 High School Survey Discussion of Factors

4.2.4.1 Careers in construction are less prestigious than other industries.

The students were largely undecided about whether careers in construction were prestigious. Students did not view people working in construction as prestigious even though 65% of the respondents stated that they knew someone working in the construction industry. Jobs in construction were generally seen as a low status career (ILO, 2001).

4.2.4.2 Construction offers little career advancement opportunities.

The findings suggest that the students in both samples were unsure and/or undecided about the career advancement opportunities in construction. Career paths have previously been known to be unclear in the construction industry (Makhene and Twala, 2009).

4.2.4.3 A job in construction does not pay well.

The majority of the students reported that a job in construction paid well. This finding differs from what other studies have found. One study found that general construction workers were paid less than the subsistence wage (Samara, 2009). This shows that a portion of the workforce was severely underpaid and that the students did not know of this.

4.2.4.4 Construction provides a harsh working environment.

The students responded neutrally about whether construction was too physically demanding. It was likely that the students did not have sufficient knowledge about the construction workplace. Dehydration, strong winds and slippery conditions were a threat to all construction workers (Wolek, 2009; Radevsky, et al., 2012).

4.2.4.5 The construction industry has poor health and safety records.

The students were unsure whether construction jobs were unsafe possibly due to not knowing enough about the work being done on construction sites. It is likely that their disinterest in the industry resulted in them being unaffected by the media which highlighted news stories of site accidents. Site accidents and fatalities were still an issue the construction industry has been trying to solve (Pearce, 2003).

4.2.4.6 There is fraud and corruption in construction.

The students felt that there was indeed fraud and corruption being practiced in the construction industry. The students were exposed to the media which covered stories on the current issue of corruption in the South African construction industry. It shows that the students were aware of the lack of transparency during the procurement stages and the presence of tenderpreneurs. The media is currently investigating the allegations of cartels during the construction of the 2010 FIFA World Cup stadia (Visser, 2013).

4.2.4.7 Construction is a male dominated industry.

The students were neutral in their scoring of this statement. The majority of the respondents were female (see Table 3) and their mean was also neutral. It is a good sign that the female respondents did not score in the extreme and agree with this statement.

The students were not subjected to all of the factors mentioned in Chapter 2 as the rest of those factors were tested by the employers and employees surveyed.

4.2.5 Attractiveness of careers in construction

The high school students were also asked to indicate how much they knew about the various built environment professions. Their responses are presented in Table 12.

Table 12 Knowledge of Professions

Profession	N	Mean	Std. Dev.
Architect	170	8.75	2.128
Project Manager	170	7.77	2.203
Main Contractor	170	6.83	2.780
Sub-Contractor	170	5.96	3.067
Civil Engineer	170	5.75	2.977
Quantity Surveyor	170	4.25	2.943

From Table 12 it is apparent that the students knew the most about architects (mean=8.75) and project managers (mean=7.77). They knew least about quantity surveyors (mean=4.25), civil engineers (mean=5.75) and sub-contractors (mean=5.96). Students did not know about the vast variety of careers available in the industry, since it caters for a large variety of aptitudes. Examples could include artists in architecture, mathematically gifted persons in engineering and quantity surveying, legal professionals in arbitration, adjudication and mediation, and people with managerial skills such as project managers and contractors.

Table 13 shows the means of whether the students from the two samples felt that careers in construction were attractive, whether they wanted to work in the industry and if their perception of an industry influenced their career choice.

Table 13 Construction as a career choice

Statement	Sample							
	Sample A				Sample B			
	Mean	N	Std. Dev.	Rank	Mean	N	Std. Dev.	Rank
Do you want to work in the construction industry?	6.30	27	2.127	1	3.50	143	2.831	3
How attractive is a career in construction for you?	6.22	27	2.293	2	4.39	143	2.576	2
How much does your perception of an industry influence your decision to follow a career in that industry?	6.00	27	2.402	3	6.43	143	2.25	1

Table 13 shows that a career in construction was not attractive to the respondents from Sample B with a mean of 4.39 out of 10. Students in Sample A felt slightly more strongly about the attractiveness of careers in construction (mean=6.22). It is possible that being at a career fair where there was information about the industry had some influence on their perceptions of the sector.

The students from Sample A felt more positive about working in the construction industry and ranked it highest than the students from Sample B, who ranked it third. In contrast, the students from Sample B ranked the statement regarding their perception of an industry influencing their decision to follow a career therein highest, whereas it was ranked third by the students from Sample A.

The majority of Sample B's respondents stated that they did not want to work in the construction industry (mean=3.50) while the students in Sample A were more positive in their responses (mean=6.30). It is likely that the career fair had some influence on the attitudes of the students towards working in construction. The students in Sample A reported that careers in the industry were more attractive than those in Sample B. It is evident that the students' perception of an industry influenced their attractiveness to a career in that industry (general mean=6.36). This suggests that it might be possible to attract more young people to the industry if their perception of the construction industry was improved. The lack of new entrants could be the result of the industry's poor image which resulted in the current critical skills shortage experienced in construction.

4.2.6 Reasons for construction career choices

When the students were asked if they wanted to work in construction after school and what or who influenced their decision most (79%) reported that they did not want a career in construction.

The students were asked about what or who influenced their decision. Examples of the responses include the following, namely

- *"Parents."*
- *"My dad who is also involved in construction."*
- *"My uncle owns a contracting company."*
- *"My love for science (physics, etc.) and I enjoy a challenge. Also, I'm hoping to get paid well."*

- *"I have a passion for engineering and I feel I can do well in the industry."*
- *"The interest of wanting to know how things work and what things I can create and be a part of."*
- *"The salaries and how it helps people in the community."*
- *"Teacher, by explaining how the industry works."*
- *"Friend."*

Examples of responses from those who did not want to work in construction include the following, namely

- *"Prefer working indoors."*
- *"I prefer an office job."*
- *"Because I'm a girl."*
- *"It is not suited for women."*
- *"Unsafe."*
- *"Not interested."*
- *"Because I require more info on what the construction industry requires and wants."*
- *"Already decided and enrolled in a different course."*
- *"My chosen subjects do not correspond with the entry requirements at university. My marks aren't good enough."*
- *"I would love doing the work of an engineer that works with plans, but I didn't take maths and physics as a subject."*
- *"Parents."*

4.3 Employer survey

4.3.1 Employer Sample Profile

Of the 116 construction companies invited to participate in the survey, 36 employers responded, completed and returned the completed questionnaire representing a response rate of 31%. Table 14 shows the professions of the respondents.

Table 14 Profession

Profession	N	Percent
Contractor (Con)	14	38.89%
Architect (Arc)	3	8.33%
Quantity Surveyor (QS)	6	16.67%
Civil Engineering (CE)	5	13.89%
Electrical Engineer (EE)	2	5.56%
Project Manager (PM)	1	2.78%
Construction Manager (CM)	1	2.78%
Sub-Contractor (SC)	3	8.33%
Property Developer (PD)	1	2.78%
Total	36	100.00%

The researcher surveyed more contractors than other professions as they were more willing or likely to distribute the employee or construction worker survey among their employees.

The contractors and sub-contractors were asked if they were members of the Master Builders Association (MBA). The results are shown in Table 15. Of the 17 respondents, 47% were members of the local, provincial MBA. In the sample, there were more MBA registered contractors (57%) than non-registered contractors (43%). None of the sub-contractors surveyed were members of the MBA. The registered companies were regulated by the association and had to adhere to a professional code of conduct.

Table 15 Contractors and MBA member Cross Tabulation

Profession	Member of Master Builders Association		Total
	Yes	No	
Contractor	8 (100%) *(57.1%)*	6 (66.7%) *(42.9%)*	14 (82.4%) *(100%)*
Sub-Contractor	0 (0%) *(0%)*	3 (33.3%) *(100%)*	3 (17.6%) *(100%)*
Total	8 (100%) *(47.1%)*	9 (100%) *(52.9%)*	17 (100%) *(100%)*

*Note: The italicised percentages represent the proportions within each profession whereas the non-italicised percentages represent the proportions within each category.

4.3.2 Employers' Perceptions

Employers were asked to respond to a series of 26 statements about the industry using a 5-point Likert scale where 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree. Their responses are shown in Table 16.

Table 16 Employers' attitudes toward the construction industry (ranked by means)

Statements	N	Frequency					Mean	Std. Dev	Rank
		1	2	3	4	5			
Construction companies are strongly affected by changes in the business cycle.	36	0 (0.0%)	0 (0.0%)	0 (0.0%)	22 (61.1%)	14 (38.9%)	4.39	0.494	1
Skilled labour is difficult to find.	36	0 (0.0%)	2 (5.6%)	3 (8.3%)	19 (52.8%)	12 (33.3%)	4.14	0.798	2
Construction companies are currently suffering from a shortage of skilled labour.	36	0 (0.0%)	1 (2.8%)	4 (11.1%)	22 (61.1%)	9 (25.0%)	4.08	0.692	3
The perception people have about an industry influences their decision to follow a career therein.	36	1 (2.8%)	4 (11.1%)	1 (2.8%)	26 (72.2%)	4 (11.1%)	3.78	0.898	4
Improving the quality of construction products could improve the image.	36	0 (0.0%)	3 (8.3%)	8 (22.2%)	23 (63.9%)	2 (5.6%)	3.67	0.717	5
Construction companies only employ part time labourers according to the amount of work in the pipeline.	36	0 (0.0%)	4 (11.1%)	7 (19.4%)	23 (63.9%)	2 (5.6%)	3.64	0.762	6
People applying for work can expect to be hired if they suit the requirements.	36	0 (0.0%)	7 (19.4%)	3 (8.3%)	24 (66.7%)	2 (5.6%)	3.58	0.874	7
Media campaigns targeted at the youth could attract them to work in the industry.	36	1 (2.8%)	6 (16.7%)	3 (8.3%)	24 (66.7%)	2 (5.6%)	3.56	0.939	8
The lack of skilled labour prevents companies from growing.	36	0 (0.0%)	6 (16.7%)	8 (22.2%)	18 (50.0%)	4 (11.1%)	3.56	0.909	9
There are career advancement opportunities in my firm.	36	1 (2.8%)	4 (11.1%)	7 (19.4%)	23 (63.9%)	1 (2.8%)	3.53	0.845	10
The poor image is the main reason why there is a critical skills shortage due to the industry's unattractiveness as a career choice.	36	1 (2.8%)	8 (22.2%)	7 (19.4%)	14 (38.9%)	6 (16.7%)	3.44	1.107	11
Working on construction sites is safe.	36	0 (0.0%)	8 (22.2%)	7 (19.4%)	19 (52.8%)	2 (5.6%)	3.42	0.906	12
My company regularly promotes careers in the industry.	36	2 (5.6%)	10 (27.8%)	6 (16.7%)	16 (44.4%)	2 (5.6%)	3.17	1.082	13
The average age of the workforce is over 40 years.	36	0 (0.0%)	10 (27.8%)	13 (36.1%)	11 (30.6%)	2 (5.6%)	3.14	0.899	14

Table 16 Continued.

Statements	N	Frequency					Mean	Std. Dev	Rank
		1	2	3	4	5			
Jobs in construction pay well.	36	1 (2.8%)	11 (30.6%)	8 (22.2%)	16 (44.4%)	0 (0.0%)	3.08	0.937	15
There are many young people currently employed in the construction industry.	36	2 (5.6%)	11 (30.6%)	11 (30.6%)	11 (30.6%)	1 (2.8%)	2.94	0.984	16
I would encourage my children to pursue a career in construction.	36	7 (19.4%)	9 (25.0%)	6 (16.7%)	9 (25.0%)	5 (13.9%)	2.89	1.369	17
The industry regularly promotes itself in the media.	36	3 (8.3%)	12 (33.3%)	11 (30.6%)	10 (27.8%)	0 (0.0%)	2.78	0.959	18
The public perceive the construction industry as a positive one.	36	3 (8.3%)	15 (41.7%)	7 (19.4%)	11 (30.6%)	0 (0.0%)	2.72	1.003	19
The construction industry enjoys a positive image.	36	5 (13.9%)	13 (36.1%)	10 (27.8%)	8 (22.2%)	0 (0.0%)	2.58	0.996	20
I interact regularly with high school students.	36	4 (11.1%)	18 (50.0%)	5 (13.9%)	8 (22.2%)	1 (2.8%)	2.56	1.054	21
Construction companies are currently growing in capacity and workforce.	36	2 (5.6%)	20 (55.6%)	10 (30.6%)	4 (11.1%)	0 (0.0%)	2.44	0.773	22
Construction workers generally enjoy job security.	36	2 (5.6%)	21 (58.3%)	9 (25.0%)	4 (11.1%)	0 (0.0%)	2.42	0.770	23
I attend career fairs and events to promote my company and the industry.	36	6 (16.7%)	20 (55.6%)	3 (8.3%)	7 (19.4%)	0 (0.0%)	2.31	0.980	24
Construction contracts are transparent and fraud free.	36	10 (30.6%)	14 (38.9%)	6 (16.7%)	6 (16.7%)	0 (0.0%)	2.22	1.045	25
I regularly visit high schools to inform them about careers in construction.	36	12 (33.3%)	18 (50.0%)	4 (11.1%)	2 (5.6%)	0 (0.0%)	1.89	0.820	26

According to Table 16, the employers in the construction industry felt most strongly about construction companies being heavily affected by changes in the business cycle or economic conditions (mean=4.39), skilled labour was difficult to find (mean=4.14) and that companies were currently suffering from a shortage of skilled labour (mean=4.08). These findings align with the quarterly study performed by the Construction Industry Development Board (CIDB) where 43% of building contractors reported shortage of skilled labour as a constraint to their business success in the 2nd quarter of 2013 (CIDB, 2013c). Most of the respondents to this survey (86%) agreed that construction companies were currently suffering from a skilled labour shortage.

In contrast, the employers stated that they did not visit high schools to inform the students about careers in construction (mean=1.89) and they did not attend career fairs to promote the industry and their company (mean=2.31). They also disagreed about construction contracts being transparent and fraud free (mean=2.22).

In general, the employers agreed with most of the statements as 15 (58%) statements had a mean of over 3.00. They were undecided about 4 (15%) statements which resulted in a mean between 2.60 and 2.40. The respondents tended to disagree that the industry enjoyed a positive image (mean=2.58). However, half of the respondents (50%) felt that the industry did not have a positive image, whereas only 22% felt that it did. Employers tended to disagree that they interacted with high school students (mean=2.56). More than half of the respondents (61%) stated that they did not interact regularly with high school students, as opposed to 25% who stated that they did. Employers tended to disagree that construction companies were currently growing in capacity and workforce (mean=2.44) with 61% reporting that construction companies were not currently growing in capacity and workforce, whereas 11% thought that companies were growing. The employers tended to disagree that construction workers generally enjoyed job security (mean=2.42). The majority of the respondents (64%) felt that construction workers generally did not enjoy job security, whereas 11% felt that they did enjoy job security.

Less than half of the respondents (44%) stated that they would not encourage their children to pursue a career in construction (mean=2.89). This is worrying, as people in the industry were exposed to the practical conditions of the industry and thought it unsuitable for their children to follow their career choice or to inherit their construction firm.

The employers felt that people's perceptions about an industry influenced their decision to follow a career therein (mean=3.78). Evidently employers felt that the image problem needed to be addressed to improve the attractiveness of construction careers as a career choice. The

employers tended to agree that the industry's poor image was one of the main reasons for the lack of skilled labour (mean=3.44).

The employers also felt that by improving the quality of construction products, it could be possible to improve the image of the industry (mean=3.67). This finding reflects the findings of Rameezdeen's (2007) Delphi study. His (*Ibid.*) study showed that people's perceptions of the industry were formed through personal contacts and experience with the industry rather than media stories. He concluded that by improving the quality of construction products and the education system, the image could be improved. However, the employers thought that media campaigns could be used to attract new entrants (mean=3.56).

4.3.3 Comparisons within the Employer sample

According to Table 17, the contractors, sub-contractors, civil engineers and electrical engineers had the worst perspective of the industry (means=2.40 and less). They made up two thirds (67%) of the sample.

The quantity surveyors, whose job generally included dealing with contracts and tenders during the procurement stages, felt that the contracts were not transparent and fraud free (mean=1.67). Contractors, who dealt with contracts and tenders in order to obtain work, also felt that contracts were not transparent and fraud free (mean=2.21). The sub-contractors agreed with the contractors and quantity surveyors (mean=2.00).

Most of the various professionals stated that there were career advancement opportunities in their firms (mean=3.00 and higher). The majority of the sample felt that young people could be attracted to the industry through media campaigns, but the architects were skeptical (mean=2.33). The majority also thought that the image of the industry could be improved when the quality of construction products were improved (mean=3.00 and higher).

All respondents also stated that construction companies were strongly affected by changes in the business cycle (mean=4.00 and higher). It was apparent that changes in the economic conditions affected all companies and professions across the entire industry.

Contractors also felt that construction companies were not currently growing in capacity and workforce (mean=2.21). They also stated that there was a shortage of skilled labour (mean=3.93) and that skilled labour was difficult to find (mean=4.00). They also confirmed that construction workers did not enjoy job security (mean=2.29). All of the other professionals agreed with these statements. Contractors were generally the largest employer in the industry

and it was important for the national economy that they had a strong and growing workforce (Wibowo, 2009).

Contractors, architects, civil engineers and electrical engineers stated that they would not encourage their children to pursue a career in construction. They made up two thirds (67%) of the sample.

The contractors declared that they did not attend career fairs (mean=1.71) or visit high schools to promote the industry and careers therein (mean=1.50). It is indicative of them not being actively involved in promoting the industry and attracting a younger workforce. The other professionals, except the one property developer, also stated that they did not promote careers in the industry or interact with high school students. The industry needed promotion to attract and retain a strong workforce (Liska, 2000).

The various professionals ranked the statements they were presented very differently from each other. The contractors felt that media campaigns targeted at the youth could attract them to the industry and ranked it second. The architects ranked the statement 23rd while quantity surveyors and civil engineers ranked it 10th and 11th respectively. The civil engineers did not think that skilled labour was difficult to find, ranking it 7th. However, the other professionals ranked this statement 3rd and higher. Contractors and quantity surveyors felt that the image could be improved by improving the quality of construction products, ranking it 5th. The civil engineers also agreed by ranking it 7th while the architects disagreed and ranked it 17th. The civil and electrical engineers thought that people's perception about an industry influenced their decision of entering into that industry and ranked it highest, while the property developer ranked it 2nd and the project manager and architect ranked it 3rd. However, the contractors did not agree and ranked it 7th. The civil and electrical engineers thought that the industry's poor image was a direct cause for the industry's current critical skills shortage and ranked it 3rd and 4th respectively. The architects and quantity surveyors were less sure and ranked the statement 17th and 10th respectively. The sub-contractors did not think that companies were suffering from a skills shortage and ranked the statement 7th. However, the other professionals felt that there was indeed skills shortages and ranked it 4th and higher. The quantity surveyors ranked the statement regarding the industry enjoying a positive image 10th while it was ranked 17th by contractors and 25th by the civil engineers. The professionals generally did not think that the industry enjoyed a positive image. The professionals also thought that contracts were not transparent and fraud free where contractors ranked it 22nd and quantity surveyors 26th. The majority of the professionals did not attend career fairs or interact with high school students and ranked the statements 17th and lower.

Table 17 Profession means comparison

Statements	Profession																	
	CON (N=14)		ARC (N=3)		QS (N=6)		CE (N=5)		EE (N=2)		PM (N=1)		CM (N=1)		SC (N=3)		PD (N=1)	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Construction companies are strongly affected by changes in the business cycle.	4.57	1	4.33	3	4.17	2	4.20	1	4.00	4	5.00	1	5.00	1	4.00	2	5.00	1
Media campaigns targeted at the youth could attract them to work in the industry	4.07	2	2.33	23	3.17	10	3.00	11	4.00	4	4.00	3	4.00	2	3.33	10	4.00	2
Skilled labour is difficult to find	4.00	3	5.00	1	4.17	2	3.60	7	4.50	1	4.00	3	4.00	2	4.67	1	4.00	2
Construction companies are currently suffering from a shortage of skilled labour.	3.93	4	4.67	2	4.33	1	4.00	3	4.50	1	4.00	3	4.00	2	3.67	7	4.00	2
Improving the quality of construction products could improve the image	3.71	5	3.00	17	3.67	5	3.60	7	3.50	10	4.00	3	4.00	2	4.00	2	4.00	2

Table 17 Continued.

Statements	Profession																	
	CON		ARC		QS		CE		EE		PM		CM		SC		PD	
	(N=14)		(N=3)		(N=6)		(N=5)		(N=2)		(N=1)		(N=1)		(N=3)		(N=1)	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
People applying for work can expect to be hired if they suit the requirements.	3.64	6	3.67	10	3.17	10	4.00	3	3.00	12	4.00	3	2.00	19	4.00	2	4.00	2
The perception people have about an industry influences their decision to follow a career therein.	3.57	7	4.33	3	3.83	4	4.20	1	4.50	1	4.00	3	2.00	19	3.33	10	4.00	2
The lack of skilled labour prevents companies from growing.	3.57	7	4.33	3	3.33	8	3.00	11	4.00	4	4.00	3	2.00	19	4.00	2	4.00	2
The poor image is the main reason why there is a critical skills shortage due to the industry's unattractiveness as a career choice.	3.57	7	3.00	17	3.17	10	4.00	3	4.00	4	3.00	18	1.00	25	3.67	7	3.00	23
Working on construction sites is safe.	3.43	10	3.67	10	3.17	10	3.00	11	4.00	4	5.00	1	4.00	2	3.00	15	4.00	2

Table 17 Continued.

Statements	Profession																	
	CON (N=14)		ARC (N=3)		QS (N=6)		CE (N=5)		EE (N=2)		PM (N=1)		CM (N=1)		SC (N=3)		PD (N=1)	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
There are career advancement opportunities in my firm	3.43	10	4.33	3	3.17	10	3.60	7	3.50	10	4.00	3	3.00	16	3.67	7	4.00	2
Construction companies only employ part time labourers according to the amount of work in the pipeline	3.36	12	4.00	7	3.67	5	3.60	7	4.00	4	4.00	3	4.00	2	4.00	2	4.00	2
Jobs in construction pay well	2.93	13	3.33	14	3.33	8	2.80	14	3.00	12	2.00	23	4.00	2	3.33	10	4.00	2
The average age of the workforce is over 40 years.	2.93	13	3.67	10	3.50	7	3.40	10	2.50	16	3.00	18	2.00	19	3.00	15	4.00	2
My company regularly promotes careers in the industry.	2.86	15	4.00	7	3.00	18	4.00	3	3.00	12	4.00	3	4.00	2	2.00	21	4.00	2
The industry regularly promotes itself in the media.	2.79	16	2.33	23	3.17	10	2.40	18	2.00	17	4.00	3	4.00	2	2.33	18	4.00	2

Table 17 Continued.

Statements	Profession																	
	CON (N=14)		ARC (N=3)		QS (N=6)		CE (N=5)		EE (N=2)		PM (N=1)		CM (N=1)		SC (N=3)		PD (N=1)	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
The construction industry enjoys a positive image	2.64	17	3.33	14	3.17	10	1.80	25	2.00	17	3.00	18	2.00	19	2.33	18	2.00	26
There are many young people currently employed in the construction industry	2.64	17	4.00	7	3.00	18	2.80	14	2.00	17	3.00	18	4.00	2	3.33	10	4.00	2
I would encourage my children to pursue a career in construction.	2.64	17	2.67	21	3.17	10	2.80	14	2.00	17	4.00	3	4.00	2	3.33	10	4.00	2
The public perceive the construction industry as a positive one	2.57	20	3.33	14	2.83	20	2.80	14	2.00	17	4.00	3	3.00	16	2.00	21	4.00	2
Construction workers generally enjoy job security.	2.29	21	2.00	25	2.83	20	2.40	18	1.50	26	4.00	3	3.00	16	2.33	18	3.00	23
Construction contracts are transparent and fraud free	2.21	22	3.00	17	1.67	26	2.20	23	2.00	17	4.00	3	1.00	25	2.00	21	4.00	2

Table 17 Continued.

Statements	Profession																	
	CON (N=14)		ARC (N=3)		QS (N=6)		CE (N=5)		EE (N=2)		PM (N=1)		CM (N=1)		SC (N=3)		PD (N=1)	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Construction companies are currently growing in capacity and workforce	2.21	22	2.67	21	2.67	24	2.40	18	2.00	17	3.00	18	2.00	19	2.67	17	4.00	2
I interact regularly with high school students.	2.21	22	3.67	10	3.17	10	2.20	23	2.00	17	2.00	23	4.00	2	2.00	21	4.00	2
I attend career fairs and events to promote my company and the industry.	1.71	25	3.00	17	2.83	20	2.40	18	3.00	12	2.00	23	4.00	2	1.67	25	4.00	2
I regularly visit high schools to inform them about careers in construction.	1.50	26	2.00	25	2.33	25	1.80	25	2.00	17	2.00	23	4.00	2	1.67	25	3.00	23

4.3.4 Employer Survey Discussion of the Factors

4.3.4.1 Construction offers little career advancement opportunities.

The majority of the employers stated that there were career advancement opportunities in their firm. Previous studies have shown that career advancement opportunities were unclear to construction workers (Makhene and Twala, 2009). There could be a gap in the communication of the available career advancement opportunities between the employers and their employees.

4.3.4.2 Jobs in construction do not pay as well as other industries.

The employers felt that jobs in construction paid well despite the general knowledge of general labourers' underpayment (Samara, 2009).

4.3.4.3 The industry has poor health and safety records.

Despite the frequent reports of site accidents, the majority of the respondents felt that construction sites were safe for their workforce (Pearce, 2003). A comment was made during the subsequent interviews that the safety of sites depended on the employers and clients.

4.3.4.4 There is fraud and corruption in construction.

The majority of the employers agreed with this factor. They felt that construction contracts were not transparent enough and fraud free. The construction industry has always been plagued by the corruption practiced therein (Pearl, et al., 2005).

4.3.4.5 The construction industry is sensitive to economic conditions.

The employers were asked if they felt that construction companies were strongly affected by changes in the business cycle. All of the respondents (100%) agreed that the companies were strongly affected. This statement resulted in the highest mean, indicating the highest level of agreement for this statement and factor. Snyman (2009) stated that booms and recessions were more pronounced in the construction industry than in other industries.

4.3.4.6 There is little being done to promote the construction industry as a career choice.

The employers were asked to indicate if they visited schools or attended career fairs to promote the industry and their company. The majority of the respondents revealed that they did not interact regularly with high school students, they did not attend career fairs to promote their company and the industry, and they did not visit high schools to inform them about the careers available in the construction industry. If there was a lack of effort to promote the industry, the industry would be seen as if it did not care about the industry and those employed in it. Promotion was important to dispel the negative image the industry had (Vanhamme and Grobben, 2009).

4.4 Employee Survey

4.4.1 Employee Sample Profile

The researcher obtained permission from 6 of the contracting companies surveyed previously to survey their workforce. The sample consists of 28 construction workers from a possible 35 (response rate=80%) with various occupations and employment statuses as indicated in Table 18.

Table 18 Occupation and Employment Status Cross Tabulation

Occupation	Employment Status		Total
	Full time	Part time	
Tradesman	6 (40%) *(85.7%)*	1 (7.7%) *(14.3%)*	7 (25%) *(100%)*
Apprentice	1 (6.7%) *(25%)*	3 (23.1%) *(75%)*	4 (14.3%) *(100%)*
Operator	3 (20.0%) *(60%)*	2 (15.4 %) *(40%)*	5 (17.9 %) *(100%)*
General Labourer	5 (33.3%) *(41.7%)*	7 (53.8%) *(58.3%)*	12 (42.9%) *(100%)*
Total	15 (100%) *(53.6%)*	13 (100%) *(46.4%)*	28 (100%) *(100%)*

*Note: The italicised percentages represent the proportions within each occupation whereas the non-italicised percentages represent the proportions within each category.

In general, the sample consisted of 54% full time and 46% part time employees. The majority of the sample consisted of general labourers (43%). However they only made up a third (33%) of the total full time employed respondents. The majority of general labourers were employed on a part time basis. Most of the tradesmen were full time employees. Table 19 indicates the age groups of the sample distributed across the four occupations.

Table 19 Occupation and Age Group Cross Tabulation

Occupation	Age Group				Total
	18-25 years	25-40 years	40-60 years	60+ years	
Tradesman	1 (12.5%) *(14.2%)*	3 (33.3%) *(42.9%)*	3 (30.0%) *(42.9%)*	0 (0%) *(0%)*	7 (25.0%) *(100%)*
Apprentice	3 (37.5%) *(75%)*	0 (0%) *(0%)*	1 (10.0%) *(25%)*	0 (0%) *(0%)*	4 (14.3%) *(100%)*
Operator	0 (0%) *(0%)*	2 (22.2%) *(40%)*	2 (20.0%) *(40%)*	1 (100.0%) *(20%)*	5 (17.9%) *(100%)*
General Labourer	4 (50.0%) *(33.3%)*	4 (44.5%) *(33.3%)*	4 (40.0%) *(33.4%)*	0 (0%) *(0%)*	12 (42.9%) *(100%)*
Total	8 (100%) *(28.6%)*	9 (100%) *(32.1%)*	10 (100%) *(35.7%)*	1 (100%) *(3.6%)*	28 (100%) *(100%)*

*Note: The italicised percentages represent the proportions within each occupation whereas the non-italicised percentages represent the proportions within each age group.

The sample had an equal distribution across three of the four age groups namely, 18-25 years (29%), 25-40 years (32%) and 46-60 years (36%). There was only one respondent who were over 60 years of age, and he was an operator. The majority of the 18-25 years age group consisted of general labourers (50%) and apprentices (38%). This means that the construction workers had to start their career in construction as either general labourers or apprentices before moving on to becoming tradesmen or operators.

4.4.2 Employees' Perceptions

Table 20 Employees' attitudes toward the Construction Industry (ranked by means)

Statements	N	Frequency					Mean	Std. Dev.	Rank
		1	2	3	4	5			
I can get promoted in my company.	28	0 (0%)	3 (10.7%)	9 (32.1 %)	14 (50.0%)	2 (7.1%)	3.54	0.793	1
There are few women working in construction.	28	2 (7.1%)	5 (17.9%)	5 (17.9%)	12 (42.9%)	14 (50.0%)	3.39	1.166	2
I would encourage other people to work in construction.	28	0 (0%)	3 (10.7%)	14 (50.0%)	9 (32.1 %)	2 (7.1%)	3.36	0.780	3
Media campaigns targeted at the youth could attract them to work in the industry.	28	1 (3.6%)	3 (10.7%)	12 (42.9%)	10 (35.7%)	2 (7.1%)	3.32	0.905	4
I want to work here when I am older.	28	1 (3.6%)	5 (17.9%)	8 (28.6%)	12 (42.9%)	2 (7.1%)	3.32	0.983	5
Construction work is too hard and physical.	28	0 (0%)	7 (25.0%)	8 (28.6%)	11 (39.3%)	2 (7.1%)	3.29	0.937	6
The average age of construction workers is over 40 years.	28	0 (0%)	6 (21.4%)	11 (39.3%)	11 (39.3%)	0 (0%)	3.18	0.772	7
I enjoy working in construction.	28	1 (3.6%)	5 (17.9%)	14 (50.0%)	7 (25.0%)	1 (3.6%)	3.07	0.858	8
Working on construction sites is safe.	28	1 (3.6%)	9 (32.1 %)	7 (25.0%)	10 (35.7%)	1 (3.6%)	3.04	0.999	9
People applying for work can expect to be hired if they suit the requirements.	28	0 (0%)	5 (17.9%)	17 (60.7%)	6 (21.4%)	0 (0%)	3.04	0.637	10
I know I will not lose my job soon.	28	1 (3.6%)	8 (28.6%)	8 (28.6%)	11 (39.3%)	0 (0%)	3.04	0.922	11
There are many young people working in construction.	28	2 (7.1%)	9 (32.1 %)	8 (28.6%)	7 (25.0%)	2 (7.1%)	2.93	1.086	12
Many people want to work in construction.	28	2 (7.1%)	10 (35.7%)	11 (39.3%)	4 (14.3%)	1 (3.6%)	2.71	0.937	13
A job in construction pays well.	28	1 (3.6%)	12 (42.9%)	11 (39.3%)	4 (14.3%)	0 (0%)	2.64	0.780	14

Table 20 Continued.

Statements	N	Frequency					Mean	Std. Dev.	Rank
		1	2	3	4	5			
The public perceive the construction industry as a positive one.	28	3 (10.7%)	9 (32.1 %)	13 (46.4%)	3 (10.7%)	0 (0%)	2.57	0.836	15
I would encourage my children to pursue a career in construction.	28	4 (14.3%)	12 (42.9%)	8 (28.6%)	4 (14.3%)	0 (0%)	2.43	0.920	16
Construction workers are respected in the community.	28	7 (25.0%)	9 (32.1 %)	8 (28.6%)	4 (14.3%)	0 (0%)	2.32	1.020	17

The employees were asked to indicate their level of agreement with a series of 17 statements on a scale of 1-5 where 1=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree. Their responses are shown in Table 20. The highest mean was 3.54 which suggests that employees were not in agreement with most of the statements presented to them.

The employees generally felt the strongest about getting promoted at their firms (mean=3.54), that there were few women employed in construction (mean=3.39) and that they would encourage other people to join the industry (mean=3.36). It is worth noting that the employees largely did not want to encourage their children to pursue a career in construction (mean=2.43). This could suggest that they would rather encourage other people than their family to join the construction industry.

In contrast, the employees felt the least strongly about construction workers being respected in their communities (mean=2.32), encouraging their children to pursue a career in construction (mean=2.43) and the public perceiving the construction industry as a positive one (mean=2.57).

The employees were asked if they thought that the public thought the construction industry enjoyed a positive image. The majority of the sample disagreed (43%) whereas only a tenth (11%) felt that the industry enjoyed a positive image. It was apparent that the workforce did not view the industry in a positive light. The employees also felt that construction workers were not respected in their communities.

4.4.3 Comparisons within the Employee Sample

The tradesmen felt most strongly about them wanting to work in the industry when they are older (mean=4.00), that media campaigns could encourage the youth to join the industry (mean=3.71), and that the average age of the workforce was over 40 years (mean=3.71). They felt least strongly about a job in construction being paid well (mean=2.71), there being many young people currently employed in the industry (mean=2.71), and working on construction sites being safe (mean=2.86).

The apprentices thought that there were few women employed in the industry (mean=4.25), that they could get promoted in their company (mean=4.00), and that construction work was too hard and physical (mean=3.75). However, they did not think that construction workers were respected in their communities (mean=2.00), that they would not lose their job soon (mean=2.00), and that many people wanted to work in construction (mean=2.50).

The operators agreed that they could get promoted, that they would encourage other people to join the industry, that construction sites were safe and that they would not lose their job soon (means=3.80). In contrast, they disagreed that construction workers were respected in their communities (mean=2.20) and that there were few women employed in the construction industry (2.60).

The general labourers stated that they could get promoted in their firms (mean=3.50), there were few women in construction (mean=3.33), and there were many young people in the industry (mean=3.17). On the contrary, they would not encourage their children to join the industry (mean=1.75), they stated that construction workers were not respected in their communities (mean=2.08), and the public did not perceive the industry as a positive one (mean=2.08).

The tradesmen stated that they wanted to continue working where they were when they were older and ranked it highest. The apprentices ranked this statement 7^{th}, while the operators and general labourers ranked it 5^{th} and 8^{th} respectively. It could suggest that the tradesmen were better employed or that they enjoyed better working conditions than the other occupations surveyed. The tradesmen thought that the average age of the workforce is over 40 years and ranked it 2^{nd} while it was ranked 8^{th} by apprentices, 10^{th} by operators and 5^{th} by general labourers. It suggests that the average age of the workforce is different according to the occupations. The tradesmen were certain of their job security and ranked the respective statement 6^{th} while the operators ranked it highest. The apprentices and general labourers were more uncertain and ranked the statement 16^{th} and 10^{th} respectively.

Table 21 Occupation Means Comparisons

Statements	Occupation															
	Tradesman				Apprentice				Operator				General Labourer			
	Mean	N	Std. Dev.	Rank	Mean	N	Std. Dev.	Rank	Mean	N	Std. Dev.	Rank	Mean	N	Std. Dev.	Rank
I want to work here when I am older.	4.00	7	0.816	1	3.25	4	0.500	7	3.40	5	0.894	5	2.92	12	1.084	8
Media campaigns targeted at the youth could attract them to work in the industry.	3.71	7	0.756	2	3.50	4	0.577	4	3.40	5	0.894	5	3.00	12	1.044	5
The average age of construction workers is over 40 years.	3.71	7	0.488	2	3.00	4	0.000	8	3.00	5	0.707	10	3.00	12	0.953	5
There are few women working in construction.	3.57	7	1.272	4	4.25	4	0.500	1	2.60	5	1.517	16	3.33	12	0.985	2
I would encourage other people to work in construction.	3.57	7	1.134	4	3.50	4	0.577	4	3.80	5	0.447	1	3.00	12	0.603	5
I enjoy working in construction.	3.43	7	0.976	6	3.50	4	0.577	4	3.00	5	0.707	10	2.75	12	0.866	12
I know I will not lose my job soon.	3.43	7	0.787	6	2.00	4	0.000	16	3.80	5	0.447	1	2.83	12	0.937	10
People applying for work can expect to be hired if they suit the requirements.	3.43	7	0.535	6	2.75	4	0.500	9	3.20	5	0.837	9	2.83	12	0.577	10
Construction work is too hard and physical.	3.29	7	0.951	9	3.75	4	1.258	3	3.40	5	0.894	5	3.08	12	0.900	4
I can get promoted in my company.	3.14	7	0.900	10	4.00	4	0.816	2	3.80	5	0.447	1	3.50	12	0.798	1
The public perceive the construction industry as a positive one.	3.14	7	0.69	10	2.75	4	0.957	9	2.80	5	0.447	14	2.08	12	0.793	15
Many people want to work in construction.	3.00	7	0.816	12	2.50	4	0.577	14	2.80	5	0.837	14	2.58	12	1.165	13
I would encourage my children to pursue a career in construction.	3.00	7	0.816	12	2.75	4	0.957	9	3.00	5	0.707	10	1.75	12	0.622	17
Construction workers are respected in the community.	3.00	7	1.155	12	2.00	4	0.816	16	2.20	5	0.837	17	2.08	12	0.996	15
Working on construction sites is safe.	2.86	7	1.215	15	2.75	4	0.957	9	3.80	5	0.447	1	2.92	12	0.996	8
There are many young people working in construction.	2.71	7	1.254	16	2.50	4	1.291	14	3.00	5	0.707	10	3.17	12	1.115	3
A job in construction pays well.	2.71	7	0.756	16	2.75	4	0.500	9	3.40	5	0.894	5	2.25	12	0.622	14

4.4.4 Employee Survey Discussion of the Factors

4.4.4.1 Careers in construction are less prestigious than other industries.

The employees were asked if they thought construction workers were respected in their communities and the majority stated that they were not. It was expected that if a career in construction was seen as prestigious, the construction workers would have been respected among their communities. Previous studies have shown that construction workers have held a poor image of their own profession (Tucker, et al., 1999).

4.4.4.2 Construction offers little career advancement opportunities.

The employees were asked if they could get promoted in their company. The majority of the respondents thought that they could achieve promotions and grow in their company. Makhene and Twala (2009) stated that construction workers generally were not aware of career advancement opportunities within their firm. The duality of the two separate findings could suggest that certain employers were more effective in informing their employees of career advancement opportunities.

4.4.4.3 Jobs in construction do not pay as well as other industries.

The employees generally felt that the jobs were not paying well. In order for contractors to retain a strong workforce, the workers must be motivated. Workers in construction were motivated with monetary benefits (Liska, 2000).

4.4.4.4 The industry has poor health and safety records.

The employees were asked to indicate whether they thought that working on construction sites were safe. The respondents were largely divided and equal numbers agreed (39%) than disagreed (36%) with the statement. The surplus respondents were undecided. It could be suggested that different employers and clients applied different levels of health and safety procedures for different projects. However, the health and safety records were still worrying (Pearce, 2003).

4.4.4.5 The construction industry is sensitive to economic conditions.

This factor was presented in the form of the employees' views toward their job security; do they expect to keep their job in the foreseeable future? When economic conditions changed, construction workers' job security became under scrutiny (ILO, 2001). Relatively equal numbers of respondents agreed (39%) than disagreed (32%) with the statement regarding their job security. The surplus respondents were undecided. It was expected that it depended on the employer and the company's economic position in the construction market.

4.4.4.6 Construction is a male dominated industry.

The employees were asked if they thought that there were few women currently employed in the construction industry. The majority of respondents stated that there were few women in construction. The construction industry was experiencing gender inequalities (Ginige, Amaratunga and Haigh, 2007).

4.5 Interviews

4.5.1 Interview Sample Profile

Four (4) employers in the construction industry were interviewed. The sample consisted of employers who had over 20 years of industry experience and who ran multi-million rand projects. The majority of these multi-million rand projects were infrastructure related projects in the local KwaZulu-Natal province. Table 22 shows an overview of the sample profile, stating the interviewees' professions and amount of years' experience in the construction industry.

Table 22 Interviewee Sample Profile

Respondent	Profession	Years' Experience
1	Project Manager	21
2	Civil Engineer	33
3	Electrical Engineer	28
4	Civil Engineer	24

4.5.2 Interview discussion

4.5.2.1 Perception of the image of the construction industry

The introductory question aimed at establishing the general views the interviewees had toward the image of the industry (Appendix C). However, all interviewees elaborated and identified some of the reasons the industry was faced with a poor image. Three quarters (75%) of the interviewees stated that the industry did have a poor image. However, the fourth interviewee acknowledged that the industry has undergone some recent scrutiny and had some negative media attention, but he still felt that the industry had a relatively good image.

Most of the interviewees (75%) made reference to the collusion exercised by some of the prominent companies in the industry during the construction of the FIFA World Cup stadia prior to 2010. *"...the industry has a lot of work to do to rebuild the image after the recent media stories regarding the collusion during the World Cup."*

One interviewee said that the lack of promotion was causing the poor image. *"...the public is subjected to traffic chaos and workers striking, but nothing is said like, "Look at this beautiful bridge that is being built."*

Another interviewee stated that the poor economic conditions were to blame for the industry's image. *"...there are not a lot of job opportunities in the first place and there's not a lot going on because of the economy of the country."*

One interviewee felt that the amount of site accidents caused the industry's poor image. *"...for the last year or so we hear about buildings under construction collapsing and killing workers."*

4.5.2.2 Contributory factors to the industry's negative image

The interviewees were allowed to elaborate on what they thought contributed to the industry's poor image. Half of the interviewees (50%) cited collusion and corruption, lack of promotion and poor publicity, and site accidents as the major contributory factors. *"The media reports, mainly. With the recent collusion, collapsing buildings, site accidents, etc. we've had a lot of negative publicity."*

One interviewee (25%) reaffirmed the poor economy as a contributory factor.

4.5.2.3 Loss of Human Capital

The interviewer tested a theory, identified in research on the construction industry in Europe and the US, in a South African context. All the interviewees (100%) agreed with the statement that there were more people leaving the industry than there were entering it.

One interviewee (25%) revealed that the employment levels were cyclical and dependent on the economic conditions. He also mentioned the lack of job security of the workforce as a reason for people exiting the industry. *"…the cycle of construction is an up and down cycle the whole time and at the moment there's a downward cycle and those leaving the industry never comes back. They'd rather work in a shop where they have a steady income than to have a job one day, and the next day, not have a job."*

Only one interviewee (25%) stated that his company was addressing this problem. The company has undergone an employment drive for the next 5 to 7 years. *"…we've just gone into a very big employment drive to try and get more people in."*

4.5.2.4 Suitable job applications

All of the interviewees stated that they have recently advertised for vacancies within their firm, but little to none of the applicants were sufficiently trained. *"…we have recently advertised for positions that were vacant and we couldn't get ANY qualified people. There were 3 guys that were qualified but they didn't have the experience we expected from them and we didn't fill the post at all. We had something like 70 applications of which the balance were not qualified."*

Most of the interviewees (75%) stated that the applicants had no formal training and no practical experience. *"We do get some people who have got the qualifications but little to no actual experience."*

The lack of skilled applicants could suggest a lack of skilled labour and/or a high demand for skilled labourers, where few of them are unemployed.

4.5.2.5 Frequency of training applicants

Most of the interviewees (75%) stated that they had to train applicants every time they hired new staff. *"…the guys coming from Varsity or Tech, they have not worked in an environment of business, so we have to train CAD and packages and skills."*

The other interviewee (25%) stated that his company looked to employ people who were already trained.

4.5.2.6 Relationship between the image and the skills shortage

All of the interviewees (100%) agreed that there was indeed a relationship between the image and the skills shortage. It was mentioned that young people were not prepared to work in an industry with low salaries (in comparison with other professionals) and on site with potential hazards. *"The lawyer and the doctor's perception of the salary are much higher than the engineer's and that is a fact." "…the amount of site accidents could prevent young people from being encouraged by their parents to join the industry."*

Half of the interviewees (50%) thought that if the industry would be blooming, people would be interested in joining the industry.

4.5.2.7 Ensuring a sustainable and growing industry

The interviewees were given a chance to state their opinion on what was needed to ensure a sustainable and growing industry.

The majority of the interviewees (75%) stated that they thought that the economy must improve to attract more investment into local companies, allowing them to grow. *"The economy has to improve so more people could be employed and SMEs can have a better chance of success."*

Half of the interviewees (50%) felt that local companies must be allowed to grow in capacity and workforce and thereby creating employment and a skilled workforce. *"There must be more people outside the country investing here so that money can become available to do developments."* Companies who were willing to invest into the training of their workforce could have had a positive effect in addressing the issue of the critical skills shortage.

Only one interviewee stated that the image of the industry must be improved. *"The image should be improved to attract a high quality of youngsters who will bring some innovation into the industry."*

4.5.2.8 Key criteria which will provide a sustainable industry

The responses to this topic were similar to the previous topic. However, one more interviewee stated that the image of the industry had to be improved. He also stated that the institute was aimed at protecting the public from the civil engineers; but the engineers themselves were not protected. He felt that this was an important point that had to be changed. *"Doctors are protected by their institute where our institute (SAICE) protects the public, not us."*

4.5.2.9 Improving the image and ensuring industry growth

The interviewees were encouraged to state what their opinions were on how the industry's poor image could be improved.

The interviewees provided three suggestions and each suggestion was provided by two interviewees (50% each). The interviewees felt that strong media campaigns, a better economy, more investment and an improvement of the quality of construction products could strive to better the image of the industry. *"The image of the company is the product that you deliver at the end of the day." "I think it is directly influenced by investments and developments and if there're no investments available or people interested, then I don't think there will be growth in any company." "The image must be improved to attract young people; campaigns can do that I think."*

4.6 Summary

This chapter presented the findings and analyses of the four research instruments. The findings were related to the hypotheses and study objectives which formed the core of this research. The following chapter draws conclusions from the research findings and makes recommendations for further action and research.

CHAPTER 5 – CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The following chapter draws conclusions from the findings outlined in the Data Analysis chapter (Chapter 4) and relates it to the hypotheses and research objectives stated in Chapter 1.

5.2 Summary

The purpose of this study was to determine the image of the South African construction industry from the perspective of school leavers, employers and employees currently working in the construction industry. This study linked the industry's image to the amount of new entrants and the current critical skills shortage experienced in the industry. The problem statement that guided the direction of the study and its objectives was the following:

The construction industry suffers from a poor image, resulting in a critical skills shortage due to the lack of new entrants into the industry, consequently hindering the growth of the industry.

The objectives of the study were:

1. To determine if promotion affects the attractiveness of careers in construction; and
2. To determine if there is a lack of promotion and knowledge of careers in construction resulting in a critical skills shortage.

The researcher used both quantitative and qualitative research methodologies. Samples of high school students, and employers and employees in construction were surveyed. A sample of experienced professionals, with over 20 years of experience, was interviewed. It was found that the industry did suffer from a poor image and that students generally had a lack of knowledge about the careers available in construction. The lack of new entrants was due to the industry's unattractiveness as a career choice.

5.3 Hypothesis testing

5.3.1 Hypothesis 1: Improving the poor image of the construction industry will improve its sustainability by attracting more new entrants.

The high school students were largely undecided about the industry's image. Almost half of the respondents (45%) scored between 4 and 6 where the neutral point was 5.50.

The majority of the employers surveyed felt that the industry did not enjoy a positive image and that the public also did not perceive the industry in a positive light. The industry professionals interviewed agreed that the image was poor and cited collusion, site accidents, poor economic conditions, lack of promotion and poor publicity as the major causal factors of the industry's poor image.

When the employers were asked whether they felt that the construction industry enjoyed a positive image, most of them disagreed with the statement. The majority also stated that the public did not view the construction industry as positive.

The employees stated that the public did not have a favourable view of the industry and that the construction workers were not respected in their communities.

The employers felt that construction companies were not currently growing in workforce and capacity. The lack of skilled labour was a constraint to their business. The professionals interviewed stated that an injection of money was needed in the industry to ensure a growing workforce and sustainable industry. They felt that a strong workforce was an important factor for a sustainable industry.

The majority of the students indicated that they did not view careers in construction as attractive and they did not want to work in the industry. The industry's poor image discouraged students from wanting to work in the industry. The lack of new entrants in the industry could worsen the industry's current skills shortage.

The professionals, who were interviewed, stated that the industry's image and amount of accidents did indeed discourage people from joining the industry.

The hypothesis that the sustainability of the construction industry can be improved if the image is improved and more new entrants are attracted could not be rejected.

5.3.2 Hypothesis 2: The critical skills shortage is due to the poor image and the lack of promotion and knowledge of careers in construction.

The majority of the employers from construction companies in the Greater Durban metropolitan stated that they were experiencing shortages of skills. The professionals interviewed stated that construction companies in general were suffering from skills shortages. They stated that they had to train applicants every time.

The students displayed severe ignorance about the inner workings of the industry and the professions available therein. It was expected that had there been sufficient promotion done towards high school students, they would have responded to the survey with more confidence.

Worryingly, the majority of employers stated that they were not involved in promoting careers in the industry. They did not attend career fairs or interact with high school students.

If there was a lack of promoting the industry, the industry would be seen as indifferent about the industry and those employed in it. It was important that the positives of the industry were portrayed to the public and the image improved.

It was apparent that there was a general lack of effort to promote the industry and careers therein. The majority of the employers stated that they did not interact with high school students, they did not attend career fairs and that they did not visit high schools to inform the students about the various careers available in the industry. Those employed in the industry did not dispel the negative perceptions the school students had. The lack of promoting the positives about careers in the industry contributed to the industry's unattractiveness as a career choice.

The students indicated that their career decisions were influenced by their perceptions of the industry.

The majority of the employers felt that the industry's poor image was one of the main reasons for the current skills shortage. The interviewed professionals agreed that there was a link between the industry's poor image and the skills shortage.

The hypothesis that the industry is experiencing a critical skills shortage due to the industry's poor image and the lack of promotion and knowledge of careers in construction could not be rejected.

5.4 Recommendations

5.4.1 Recommendations to the construction industry

The industry must work towards making the careers attractive for the young adult. By improving the image of the industry, it could be expected that the public will have a higher regard for those employed in construction. Parents and career advisers, who generally influence the career choice of school leavers, must also see careers in construction in a positive light.

It is important that the industry promotes itself by teaching school leavers about the workings of the industry and the variety of available careers therein. It could be promoted as exciting as no two projects are exactly the same. Each project presents its own challenges and as technology is evolving, so are the careers in construction.

The working conditions on site must be improved. The harsh conditions make it difficult to promote the industry in a positive light.

The factors identified in Chapter 2 and tested in Chapter 4 must be addressed before the image of the industry can be addressed. These could act as objectives for the industry and government in order to achieve the long-term goal of a positive and healthy industry.

5.4.2 Recommendations to the Department of Education

Due to the students' general lack of knowledge about the industry and the careers therein; it seems apparent that the current curriculum within the educational system is falling short of preparing high school students adequately for careers within the construction industry. Schools and some of the key construction companies must create a programme where students must be given the opportunity to visit construction sites on a regular basis to expose students to the professionals and inner workings of the industry. Students could participate in some of the stages and/or witness a project from start to completion.

It is through the influx of young blood that the industry will be sustained as a severe shortage of workers and professionals will result in the demise of South Africa's construction industry.

Cooperation between the government at all levels and the construction industry should be encouraged with regard to infrastructure development; thereby ensuring job creation, socio-

economic development, remaining an important role player in the world economy, and the sustainability of the industry.

5.5 Recommendations for further research

It is recommended that research be done on the perceptions of the construction industry from the perspective of school leavers in the other provinces of South Africa and comparisons be drawn. It is important to establish the image of the industry from a national perception before strategies could be developed by the government at national level and the councils responsible for the construction industry.

It is recommended that research be done on setting achievable short-term objectives on improving the industry's image. It is important to acknowledge that the image issue is a long-term problem so that realistic targets can be set. The factors that contributed to the industry's poor image could be investigated and identified as short term targets, and addressed in order to improve the image.

It would be important to research what has been done to improve the image in a global sense and if it has had any success. It could be possible to adjust such a strategy to suit the needs of the South African construction industry.

It is recommended that the possibility of building relationships between construction companies and schools be investigated. Exposing students to construction sites and the professionals involved in the industry could help in dispelling the negative perceptions of the industry and in promoting an exciting and technologically advanced industry. A programme could be developed to incorporate this experience into the school curriculum.

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APPENDIX A – QUESTIONNAIRES

High School Students Questionnaire

Careers in Construction Questionnaire

Note: "Careers in construction" include careers at all levels, i.e. architects, civil engineers, electrical engineers, geotechnical engineers, interior designers, land surveyors, main contractors, project managers, quantity surveyors, site supervisors, specialist contractors, structural engineers, sub-contractors, etc.

DO NOT WRITE YOUR NAME ON THIS QUESTIONNAIRE

Please **CIRCLE** your answers

Please complete **BOTH** sections A and B

i Name of school: _____

ii Grade: ____

iii Gender: Male Female

iv Do you know someone who works in the construction industry? Yes No

iv.i Who is this person?
Parent Sibling Uncle Friend Other None

SECTION A: Attitude towards the Construction Industry

1 How do you view the construction industry?
Very Negative Negative Undecided Positive Very Positive

2 For the following statements, please rate whether you disagree or agree. (1 being strongly disagree and 10 being strongly agree)

2.1	Working in the construction industry is unsafe.	1	2	3	4	5	6	7	8	9	10
2.2	The construction industry pays well.	1	2	3	4	5	6	7	8	9	10
2.3	The construction industry is a male dominated industry.	1	2	3	4	5	6	7	8	9	10
2.4	A career in the construction industry is prestigious.	1	2	3	4	5	6	7	8	9	10
2.5	The construction industry is too physically demanding.	1	2	3	4	5	6	7	8	9	10
2.6	A career in the construction industry is fulfilling as results can be seen.	1	2	3	4	5	6	7	8	9	10
2.7	There are less career advancement opportunities in the construction industry.	1	2	3	4	5	6	7	8	9	10
2.8	There is no corruption in the construction industry.	1	2	3	4	5	6	7	8	9	10
2.9	There are a lot of problem solving opportunities in construction projects.	1	2	3	4	5	6	7	8	9	10
2.10	It is better to work in an office than it is to work outside on site.	1	2	3	4	5	6	7	8	9	10
2.11	A job in an office pays more than a job on site.	1	2	3	4	5	6	7	8	9	10

PLEASE TURN OVER

Careers in Construction Questionnaire

2.12	A career in the construction industry is rewarding.	1	2	3	4	5	6	7	8	9	10
2.13	A career in the construction is better than a career in other industries.	1	2	3	4	5	6	7	8	9	10
2.14	The construction industry enjoys a positive image.	1	2	3	4	5	6	7	8	9	10
2.15	Construction is not an industry suited for disabled persons.	1	2	3	4	5	6	7	8	9	10
2.16	There are not many jobs available in construction	1	2	3	4	5	6	7	8	9	10

SECTION B: Careers in the Construction Industry

1 Have you already decided on what career path you want to follow after school? Yes No

2 Do you plan on working in the construction industry after school? Yes No

2.1 If yes, what or who influenced your decision?

_____

_____

2.2 If not, why?

_____

_____

3 For the following questions, please rate how much you know. (1 being very little and 10 being everything)

3.1	Do you know what a civil engineer does?	1	2	3	4	5	6	7	8	9	10
3.2	Do you know what a quantity surveyor does?	1	2	3	4	5	6	7	8	9	10
3.3	Do you know what a project manager does?	1	2	3	4	5	6	7	8	9	10
3.4	Do you know what a main contractor does?	1	2	3	4	5	6	7	8	9	10
3.5	Do you know what a sub contractor does?	1	2	3	4	5	6	7	8	9	10
3.6	Do you know what an architect does?	1	2	3	4	5	6	7	8	9	10
4	How attractive is a career in the construction industry to you? (1 being very little and 10 being very high)	1	2	3	4	5	6	7	8	9	10
5	How much does your perception of an industry influence your decision to follow a career in that industry? (1 being very little and 10 being a lot)	1	2	3	4	5	6	7	8	9	10
6	Do you want to work in the construction industry? (1 being not at all and 10 being definitely)	1	2	3	4	5	6	7	8	9	10

6.1 If yes, what do you want to become?
Civil Engineer Quantity Surveyor Architect Contractor Project Manager

Employer Questionnaire

University of KwaZulu-Natal
Faculty of Engineering
School of Civil Engineering, Construction and Land Surveying
MSc Construction Management
Jurgen Human (student number: 208508323)
Questionnaire – Employer

Section 1: Profile

Please do **NOT** provide any personal information that can be traced back to you or your company.

i.

Please mark your profession with a χ:				
Contractor		Project Manager		
Architect		Construction Manager		
Quantity Surveyor		Sub-Contractor		
Civil Engineer		Property Developer		
Electrical Engineer		Other (Please specify):		

ii. Are you a member of the Master Builders Association?

Yes ☐

No ☐

Section 2: Attitudes

Please state the degree to which you agree or disagree with the following statements:						
		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	The construction industry enjoys a positive image.					
2	The perception people have about an industry influences their decision to follow a career therein.					
3	Working on construction sites is safe.					
4	Jobs in construction pay well.					
5	Construction contracts are transparent and fraud free.					
6	There are career advancement opportunities in my firm.					
7	There are many young people currently employed in the construction industry.					

University of KwaZulu-Natal
Faculty of Engineering
School of Civil Engineering, Construction and Land Surveying
MSc Construction Management
Jurgen Human (student number: 208508323)
Questionnaire – Employer

		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
8	Construction companies are strongly affected by changes in the business cycle.					
9	Construction companies are currently growing in capacity and workforce.					
10	Construction companies only employ part time labourers according to the amount of work in the pipeline.					
11	Construction workers generally enjoy job security.					
12	Construction companies are currently suffering from a shortage of skilled labour.					
13	Skilled labour is difficult to find.					
14	People applying for work can expect to be hired if they suit the requirements.					
15	The lack of skilled labour prevents companies from growing.					
16	The average age of the workforce is over 40 years.					
17	Media campaigns targeted at the youth could attract them to work in the industry.					
18	The public perceive the construction industry as a positive one.					
19	Improving the quality of construction products could improve the image.					
20	I would encourage my children to pursue a career in construction.					
21	My company regularly promotes careers in the industry.					
22	The industry regularly promotes itself in the media.					

		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
23	I interact regularly with high school students.					
24	I attend career fairs and events to promote my company and the industry.					
25	I regularly visit high schools to inform them about careers in construction.					
26	The poor image is the main reason why there is a critical skills shortage due to the industry's unattractiveness as a career choice.					

****

Thank you for completing this questionnaire and participating in my research. You are reminded of anonymity and assured that none of your personal information will be made public. Should you require any further information, do not hesitate to contact me at: 208508323@stu.ukzn.ac.za.

Jurgen Human

208508323

Employee Questionnaire

University of KwaZulu-Natal
Faculty of Engineering
School of Civil Engineering, Construction and Land Surveying
MSc Construction Management
Jurgen Human (student number: 208508323)
Questionnaire – Employee

Section 1: Profile

Please do **NOT** provide any personal information that can be traced back to you.

i.

I am a (choose one):	
Tradesman	
Apprentice	
Operator	
General labourer	
Other	

ii.

Age:	
18-25 years	
25-40 years	
40-60 years	
60+ years	

iii.

I am employed:	
Full time	
Part time	

Section 2: Attitudes

Please state the degree to which you agree or disagree with the following statements:						
		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	Construction workers are respected in the community.					
2	There are many young people working in construction.					
3	Working on construction sites is safe.					
4	I know I will not lose my job soon.					

		Strongly Disagree	Disagree	Don't know	Agree	Strongly Agree
5	I can get promoted in my company.					
6	A job in construction pays well.					
7	I enjoy working in construction.					
8	There are few women working in construction.					
9	Construction work is too hard and physical.					
10	Many people want to work in construction.					
11	People applying for work can expect to be hired if they suit the requirements.					
12	I want to work here when I am older.					
13	The average age of construction workers is over 40 years.					
14	Media campaigns targeted at the youth could attract them to work in the industry.					
15	The public perceive the construction industry as a positive one.					
16	I would encourage my children to pursue a career in construction.					
17	I would encourage other people to work in construction.					

****

Thank you for completing this questionnaire and participating in my research. You are reminded of anonymity and assured that none of your personal information will be made public. Should you require any further information, do not hesitate to contact me at: 208508323@stu.ukzn.ac.za.

Jurgen Human

208508323

APPENDIX B – INTERVIEW SCHEDULE

Questions to be answered by Experienced Industry Professionals:

1. What do you perceive to be the image of the construction industry?
2. Why?
3. What do you think contributes to the negative image the construction industry has?
4. Do you have a shortage of labourers? Or of skilled labour?
5. Research done in European countries and the US declare that there are more people leaving the industry than there are people entering it; have you experienced a similar anomaly?
6. Do you receive many job applications where the applicants are sufficiently trained when you advertise a vacancy in your business?
7. How often do you have to train applicants in the required work?
8. Do you foresee your workforce growing in the coming years?
9. Is there a positive future for your company?
10. What do you think is needed to ensure a sustainable or a growing industry?
11. What are the key points or key criteria which will provide a sustainable industry?
12. Is there a direct relationship between the image of the industry and the amount of new entrants into the industry?
13. Do you think that the amount of new entrants is influenced directly by how the public and young adults view or perceive the industry?
14. Has your company been addressing this issue?
15. If yes, how?
16. What do you think can be done to improve the image or to ensure that there is growth in the industry and for your company?

17. Would you advise your son or daughter to enter into the industry?

18. Why or why not?

19. Do you think the image of the industry has any impact on the industry?

20. Why or why not?

APPENDIX C – CONTENT ANALYSIS

Q1: What do you perceive to be the image of the construction industry?

Respondent	Response (verbatim)	Collusion	Lack of Promotion	Poor Economy	Poor image	Health and Safety
1	It is difficult for people in the construction industry to know what people outside of the industry think about the industry. But the industry has a lot of work to do to rebuild the image after the recent media stories regarding the collusion during the World Cup. They got some repair work to do.	x			x	
2	The image of the industry is pretty good but the last story in the newspapers where the construction industry got together to fix the bid prices did us extreme harm. Also the perception nowadays is that construction is corrupt and that tenders are not based fairly on price and ability to perform, and who you know is the way to get forward and that is actually quite a problem at the moment. Look at the construction work currently going on at Umgeni, the public is subjected to traffic chaos and workers striking, but nothing is said like, "Look at this beautiful bridge that is being built.".	x	x			
3	I would think that it is negative because there are not a lot of job opportunities in the first place and there's not a lot going on because of the economy of the country.			x	x	
4	I don't think the industry has a good image. A lot has been going on recently in the media about that price fixing during the World Cup. But for the last year or so we hear about buildings under construction collapsing and killing workers. I think it was in India or Bangladesh, but it happens everywhere.	x			x	x
Total		3	1	1	3	1
Percentage		75%	25%	25%	75%	25%

Q2: What do you think contributes to the negative image the construction industry has?

Respondent	Response (verbatim)	Collusion and Corruption	Poor Promotion and Publicity	Poor Economy	Site accidents
1	The media reports, mainly. With the recent collusion, collapsing buildings, site accidents, etc. we've had a lot of negative publicity	x	x		x
2	Same as the previous question. The fixing of bidding prices; it is a corrupt industry and tender processes; and poor publicity and lack of promoting the industry.	x	x		
3	Economy. I think that's one of the biggest problems.			x	
4	As I said before, buildings collapsing and deaths on site will never motivate people to join the industry. It has to be addressed and I think we have done well with the new act.				x
Total		2	2	1	2
Percentage		50%	50%	25%	50%

Q4: Research done in European countries and the US declare that there are more people leaving the industry than there are people entering it; have you experienced a similar anomaly?

Respondent	Response (verbatim)	Yes	Addressing this problem	Cyclic Employment
1	In our company, there certainly are a lot of senior people working and we've just gone into a very big employment drive to try and get more people in. Because with my company we got this MDS, a development strategy, where we are going to spend a lot of money in the next 5 to 7 years; so we need to get more people in.	x	x	
2	Yes. What happens is the cycle of construction is an up and down cycle the whole time and at the moment there's a downward cycle and those leaving the industry never comes back. They'd rather work in a shop where they have a steady income than to have a job one day and the next day not have a job. So the cycle is actually doing that to us. In booms, everyone rushes to put out tenders but when the cycle turns, a lot of people get retrenched and they never come back.	x		x
3	If I compare this statement with the companies I work with, then I think it is true.	x		
4	We have, yes. There seems to be very few young people with actual qualifications. As the older people retire, I think companies don't always have enough younger people to replace them.	x		
Total		4	1	1
Percentage		100%	25%	25%

Q5: Do you receive many job applications where the applicants are sufficiently trained when you advertise a vacancy in your business?

Respondent	Response (verbatim)	Poor quality of applicants	Applicants had no training	Applicants had no experience
1	Yes, we've just gone into a drive but we've had a problem with the quality of the applications. The applications are not what we're looking for.	x		
2	We receive a lot of job applications with no skilled training. Most of the guys we employ come from Tech and from Varsity with no skills and experience and that is the only way we can train them. What helps is that they are cheaper labour and we tend to employ them and train them.	x	x	x
3	Not at all. I'm involved with one of the municipalities where we have recently advertised for positions that were vacant and we couldn't get ANY qualified people. There were 3 guys that were qualified but they didn't have the experience we expected from them and we didn't fill the post at all. We had something like 70 applications of which the balance were not qualified.	x	x	x
4	Unfortunately, it is very difficult to get people who are already trained. We do get some people who have got the qualifications but little to no actual experience. We have to train them almost all the time.	x	x	x
Total Percentage		4 100%	3 75%	3 75%

Q6: How often do you have to train applicants in the required work?

Respondent	Response (verbatim)	Every time	Applicants already trained
1	We actually try and get people who are already trained or with experience.		x
2	The whole time. We, being consultants, the guys coming from Varsity or Tech, they have not worked in an environment of business, so we have to train CAD and packages and skills. It all happens in house.	x	
3	Whenever I appoint someone. My type of job in the consulting business is a training and experience type of environment. So all the young guys I get, I normally take under my wing and they train themselves with me to support them to get qualified as professional engineers or technicians.	x	
4	As I said just now, we have to train the new people about every time.	x	
Total Percentage		3 75%	1 25%

Q9: What do you think is needed to ensure a sustainable or a growing industry?

Respondent	Response (verbatim)	Growing local companies	Better economy and more investment	Positive image
1	An interesting comment, we've had guys visiting us from Ghana a couple of weeks ago, and one of the guys from that delegation made a comment, because they got a lot of Chinese people involved there, and that guy said: "Africa is for Africans" so they're trying to see if they cannot get us involved there.	x		
2	Continuous money from government. If there's no money, there's no growth. When the government has money, the private sector will have money.		x	
3	First of all, I think that the economy of the country needs to change. There must be more people outside the country investing here so that money can become available to do developments.		x	
4	The image should be improved to attract a high quality of youngsters who will bring some innovation into the industry. The economy has to improve so more people could be employed and SMEs can have a better chance of success.	x	x	x
Total Percentage		2 50%	3 75%	1 25%

Q10: What are the key points or key criteria which will provide a sustainable industry?

Respondent	Response (verbatim)	Business partnerships	Better economy and more investment	Improve the image
1	I think business partnerships between construction and other industries can help the construction industry	x		
2	Money like we said, but also we have to improve the image of the industry. Our jobs are very enjoyable and good but we don't promote ourselves enough to the public. If something goes wrong, it is because of the stupid project managers or engineers who don't know what they're doing. Doctors are protected by their institute where our institute (SAICE) protects the public, not us.		x	x
3	I think again, people need to come and invest into the country and into developments.		x	
4	Again, a good image; strong workforce and economic conditions for SMEs.	x	x	x
Total Percentage		2 50%	3 75%	2 50%

Q14: What do you think can be done to improve the image or to ensure that there is growth in the industry and for your company?

Respondent	Response (verbatim)	Media campaigns	Better economy and more investment	Improve the quality of product
1	Strong media campaigns attracting young people and investors.	x		
2	The image of the company is the product that you deliver at the end of the day. If you delivered a good product, the client will say, "Yes, I will go back to you again". So you have to deliver a product of exceptional quality. Unfortunately, that isn't happening but the companies who do deliver exceptional quality products, will get forward.			x
3	Again, I think it is directly influenced by investments and developments and if there're no investments available or people interested, then I don't think there will be growth in any company.		x	
4	The workforce needs to be enlarged and retained. Too many people are leaving the industry. The image must be improved to attract young people, campaigns can do that I think.	x	x	x
Total Percentage		2 50%	2 50%	2 50%

Q12: Is there a direct relationship between the image of the industry and the amount of new entrants into the industry?

Respondent	Response (verbatim)	Yes	Blooming industry and need for professionals	Salary	Site accidents
1	I'm unsure about this. But the amount of site accidents could prevent young people from being encouraged by their parents to join the industry.				x
2	Yes, I think so. Obviously, with the image being poor, the guys don't come. When I studied in 1972 we were told that the industry really needs civil engineers and we were 400 first year students. But in 1980, the image was really bad and there were only 50 first year students. So in 10 years' time, the amount of students went from 400 to 50 and it was due to the image.	x	x		
3	Definitely. If they would see the industry blooming, I'm pretty sure there would be an interest in it.	x	x		
4	Yes, very much so. They also look at the salaries because if you compare the salary of an engineer to a lawyer or a doctor, the engineer is at the bottom end of it and the QS's are with them. The lawyer and the doctor's perception of the salary are much higher than the engineer's and that is a fact.	x		x	
Total Percentage		3 75%	2 50%	1 25%	1 25%